Washburn County Land and Water Resource Management Plan 2017 - 2027

Washburn County Land and Water Conservation Department

Washburn County Land and Water Resource Management Plan

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PLAN SUMMARY

The 2017 Washburn County Land and Water Resource Management Plan (LWRMP) will serve as the department's work plan for the next ten years with a formal review after five. It involved key stakeholders in prioritizing restoration and protection strategies to address water quality problems. Its focus will be primarily on protecting the counties water resources from non-point source pollution following the administrative rules in ATCP 50, NR 151 and EPA'S nine key element planning process.

While a successful nonpoint program will take the cooperative effort of multiple agencies, the Land Conservation Committees and Departments play the lead role in the implementation of agricultural standards and prohibitions, using authorities and funding grants under Chapter 92, Wisconsin State Statutes. Consistent with § 92.10(6) (a) 5 and ATCP 50.12(2) (i) Wis. Admin. Code, the first component of this framework establishes that in their Land and Water Resource Management Plans, counties identify the strategy they will use locally to implement and ensure compliance with the State's agricultural performance standards and prohibitions.

Wisconsin Counties' responsibility for reducing non-point source pollution is a large endeavor and is non-ending. As problem areas are fixed new ones will be created. With this being the third revision of the LWRMP, new approaches were considered and developed. Of value, and not used in the previous plans was to look at four modelling programs to assess levels of pollution: EVAAL (Erosion Vulnerability Assessment for Agricultural Lands, PRESTO (Pollutant Load Ratio Estimation Tool), STEPL (Spreadsheet Tool for Estimating Pollutant Loads) and SNAP plus (**S**oil **N**utrient **A**pplication **P**lanner) were looked at. While the problems varied in using them: such as additional software needs and expertise, and estimates that are given on watershed basis versus county basis. After further consideration it was determined that SNAP plus would be the best modeling tool to use in developing this plan. It is able to give phosphorous losses on a field by field, pasture by pasture, feedlot by feedlot, and compile for each watersheds and all HUC 12 watersheds within Washburn Co. Once inventoried different conservation practices could be applied and assessed for phosphorous reduction estimates.

This was then used as the structure for assessing resource needs: for example, money, time, and an information and education program to implement these conservation practices. While there was a learning curve on how to best adapt this assessment: it gave expected estimates that are believed to be accurate. For feedlots, it ranked them to prioritize remediation efforts. Further assessment for more accurate phosphorous estimates, both in production and reduction will need to be done using Wisconsin Barnyard Runoff Model (BARNY).

INTRODUCTION

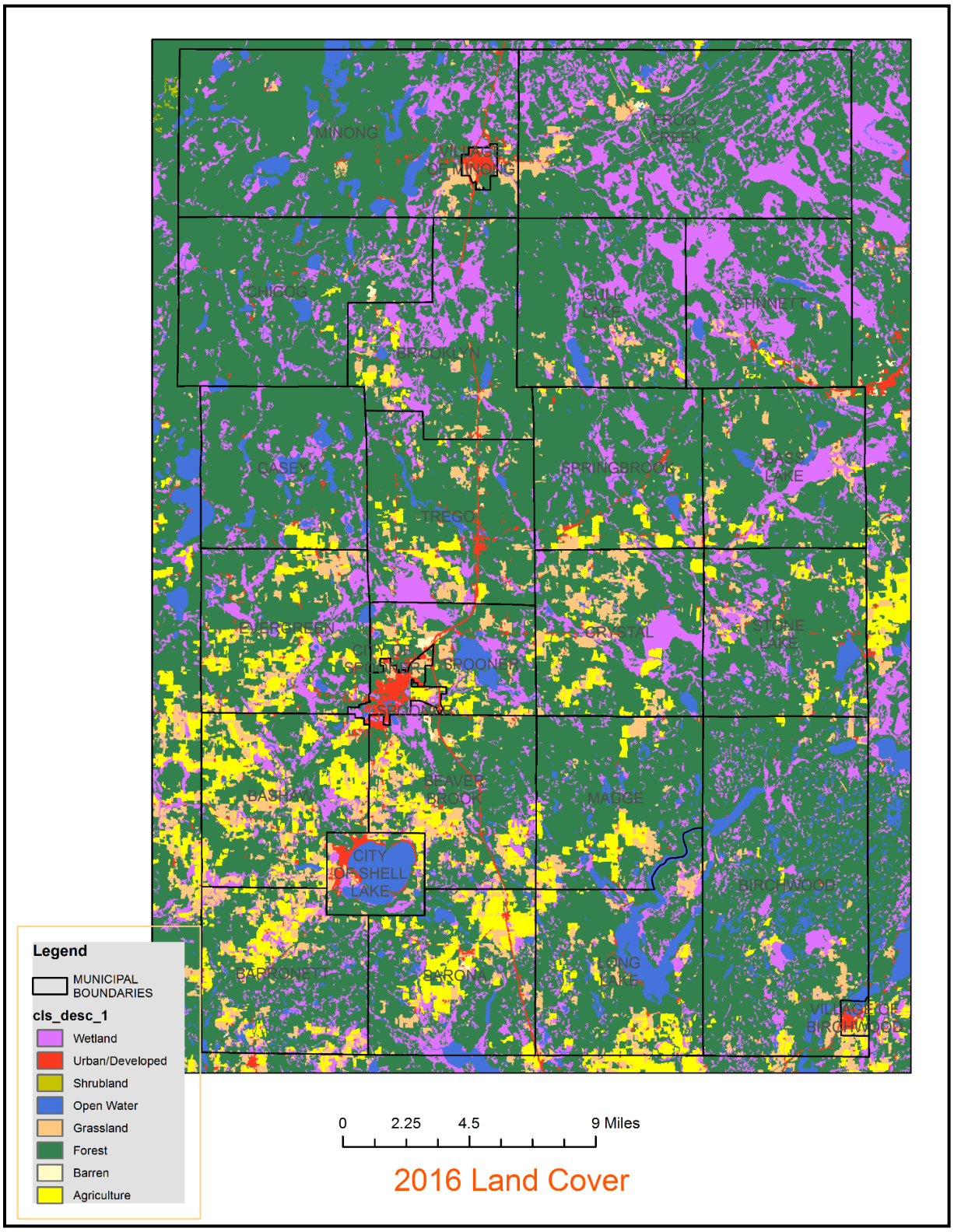
Washburn County encompasses nearly 810 square miles or about 518,000 acres. The county ranks 29th out of Wisconsin's 72 counties in terms of total land area but ranks 63rd in terms of overall population. Located within the northwestern part of the State of Wisconsin. This region is characterized by an abundance of lakes, rivers, and streams set amongst a heavily forested landscape and ranks third in the state in the number of lakes. Agricultural activity is a prominent feature of the landscape within the central and southern parts of the county. Like most northern Wisconsin counties, the overall land use and development pattern has been heavily influenced by tourism and recreational home development. Washburn County is predominantly rural with only four incorporated communities. The highest population densities within the county are found in the cities and villages, with a generally low overall population density in the rural areas except along certain lakes. However, most recent home development within Washburn County has occurred in the rural areas.

- Within Washburn County, there are 21 unincorporated towns, 2 cities and 2 villages.
- The largest community is the City of Spooner with 2,653 residents.
- The county seat is the City of Shell Lake.
- Has a population of 15,648 (as of 7/1/2016).
- A population density of 20 people per square mile (as of 7/1/2016).

Land use - An inventory of existing land uses was compiled through analysis of digital aerial photography.

Wiscland 2 is a raster representation of the land cover of Washburn County as of 2016. The dataset is primarily derived from remote sensing.

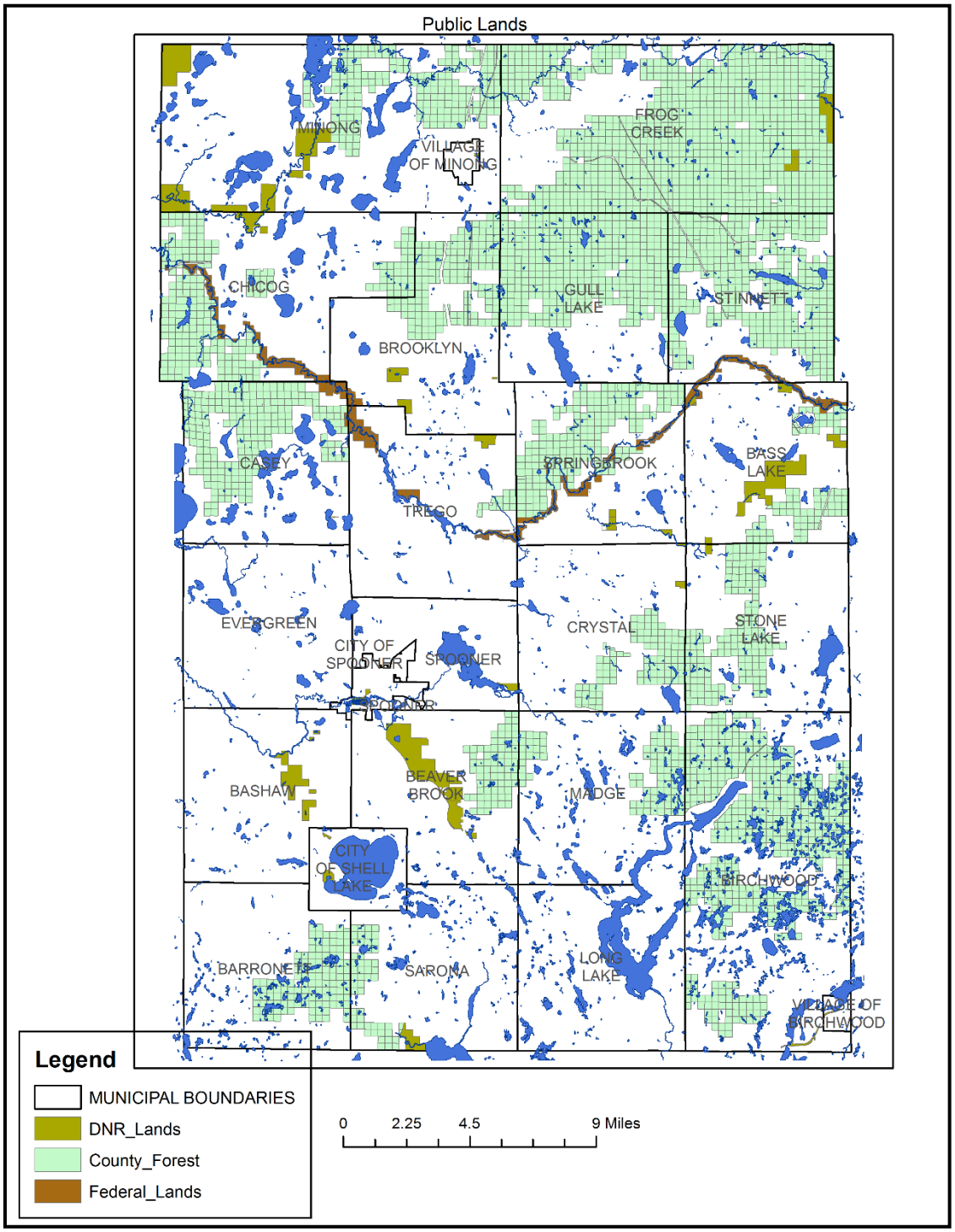
Map 1. Land Cover



Woodlands

Nearly 80 percent of the total land use within Washburn County is classified as woodland use. While there are about 425,338 acres classified as woodlands in Washburn County, nearly 141,500 acres are part of the Washburn County Forest. An additional 6,400 acres are under state ownership (Wisconsin Department of Natural Resources) and 20,374 acres are used as industrial forest. The National Park Service owns and manages 9,269 acres along the Namekagon River as part of the National Wild and Scenic Rivers system.

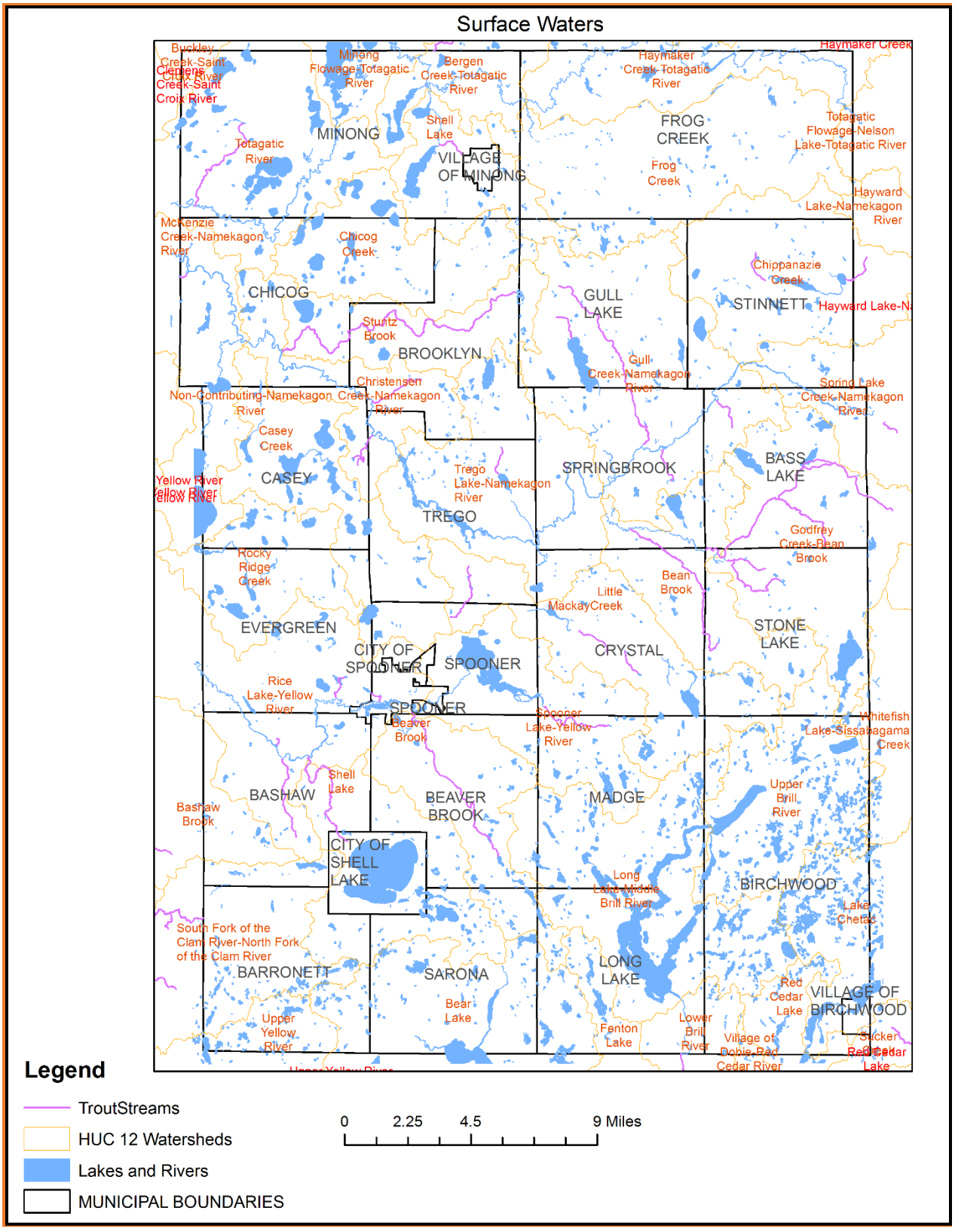
Map 2. Woodland/Public Lands



Surface water resources

Surface waters cover 31,761 acres or about six percent of Washburn County.

Map 3. Surface Water of Washburn County



Watersheds of Washburn County.

The United States is divided and sub-divided into successively smaller hydrologic units which are classified into four levels: regions, sub-regions, accounting units, and cataloging units. The first level of classification divides the Nation into 21 major geographic areas, or regions. Washburn County is in Region 07 *Upper Mississippi Region* – (The drainage of the Mississippi River Basin above the confluence with the Ohio River, excluding the Missouri River Basin.) County Land and Water Conservation Plans use HUC 12 watersheds as the standard base area for designing their Land and Water Resource Management Plans around.

The second level of classification divides the 21 regions into 221 subregions.

- Subregion 0703 --The St. Croix River Basin (7,705 sq.mi.)
  - 07030001 -- Upper St. Croix (2,030 sq. mi.) HUC 8
  - 07030002 – Namekagon (1,030 sq.mi.) HUC 8
- Subregion 0705 -- Chippewa: The Chippewa River Basin (9,570 sq.mi.)
  - 07050001 -- Upper Chippewa (1940 sq.mi.) HUC 8
  - 07050007 -- Red Cedar (1910 sq.mi) HUC 8

Table 1. Watershed Table – hydrologic unit code (HUC)

HUC 8 Watershed Name	HUC 10 Watershed Name	HUC 12 Watershed Name	Total Acres in HUC 12 Watersheds
Namekagon River	Trego Lake - Namekagon River	Bean Brook	14331
Namekagon River	Totagatic River	Bergen Creek-Totagatic River	5913
Namekagon River	Namekagon River	Casey Creek	14817
Namekagon River	Totagatic River	Chicog Creek	13386
Namekagon River	Trego Lake - Namekagon River	Chippanazie Creek	14426
Namekagon River	Namekagon River	Christensen Creek-Namekagon River	12998
Namekagon River	Totagatic River	Frog Creek	22425
Namekagon River	Trego Lake - Namekagon River	Godfrey Creek-Bean Brook	21185
Namekagon River	Trego Lake - Namekagon River	Gull Creek-Namekagon River	29047
Namekagon River	Totagatic River	Haymaker Creek-Totagatic River	10678
Namekagon River	Upper Namekagon	Hayward Lake-Namekagon River	6
Namekagon River	Trego Lake - Namekagon River	Little MacKay Creek	20381
Namekagon River	Namekagon River	McKenzie Creek-Namekagon River	12794
Namekagon River	Totagatic River	Minong Flowage-Totagatic River	2907
Namekagon River	Namekagon River	Non-Contributing-Namekagon River	906
Namekagon River	Totagatic River	Shell Lake N.	10158
Namekagon River	Trego Lake - Namekagon River	Spring Lake Creek-Namekagon River	6470
Namekagon River	Namekagon River	Stuntz Brook	11434
Namekagon River	Totagatic River	Totagatic Flowage-Nelson Lake-Totagatic River	2551
Namekagon River	Totagatic River	Totagatic River	17186
Namekagon River	Trego Lake - Namekagon River	Trego Lake-Namekagon River	21682
Upper St. Croix River	North Fork of the Clam River	Bashaw Brook	8447
Upper St. Croix River	Shell Lake - Yellow River	Beaver Brook	14410

HUC 8 Watershed Name	HUC 10 Watershed Name	HUC 12 Watershed Name	Total Acres in HUC 12 Watersheds
Upper St. Croix River	Moose River - St. Croix River	Clemens Creek-Saint Croix River	432
Upper St. Croix River	Shell Lake - Yellow River	Rice Lake-Yellow River	26536
Upper St. Croix River	Shell Lake - Yellow River	Rocky Ridge Creek	11966
Upper St. Croix River	Shell Lake - Yellow River	Shell Lake	16760
Upper St. Croix River	***North Fork of the Clam River***	***South Fork of the Clam River-North Fork of the Clam River***	18481
Upper St. Croix River	Shell Lake - Yellow River	Spooner Lake-Yellow River	17544
Upper Chippewa River	Couderay River	Whitefish Lake-Sissabagama Creek	1082
Red Cedar River	Brill River-Red Cedar River	Bear Lake	17710
Red Cedar River	Brill River-Red Cedar River	Fenton Lake	3639
Red Cedar River	Red Cedar Lake	Lake Chetac	8525
Red Cedar River	Brill River-Red Cedar River	Long Lake-Middle Brill River	26462
Red Cedar River	Brill River-Red Cedar River	Lower Brill River	4540
Red Cedar River	Red Cedar Lake	Red Cedar Lake	3964
Red Cedar River	Red Cedar Lake	Sucker Creek	565
Red Cedar River	Brill River-Red Cedar River	Upper Brill River	16262
Red Cedar River	***Yellow River***	***Upper Yellow River***	***5070***
Red Cedar River	Brill River-Red Cedar River	Village of Dobie-Red Cedar River	458

Groundwater: Resource Inventory and Assessment

Groundwater is an essential resource in Wisconsin. It provides drinking water for 70% of Wisconsin residents and 95% of Wisconsin communities. Groundwater is also valuable as a source of water for our lakes, rivers, wetlands and springs. It provides the baseflow for most streams and rivers and is the primary source of water for most lakes and wetlands.

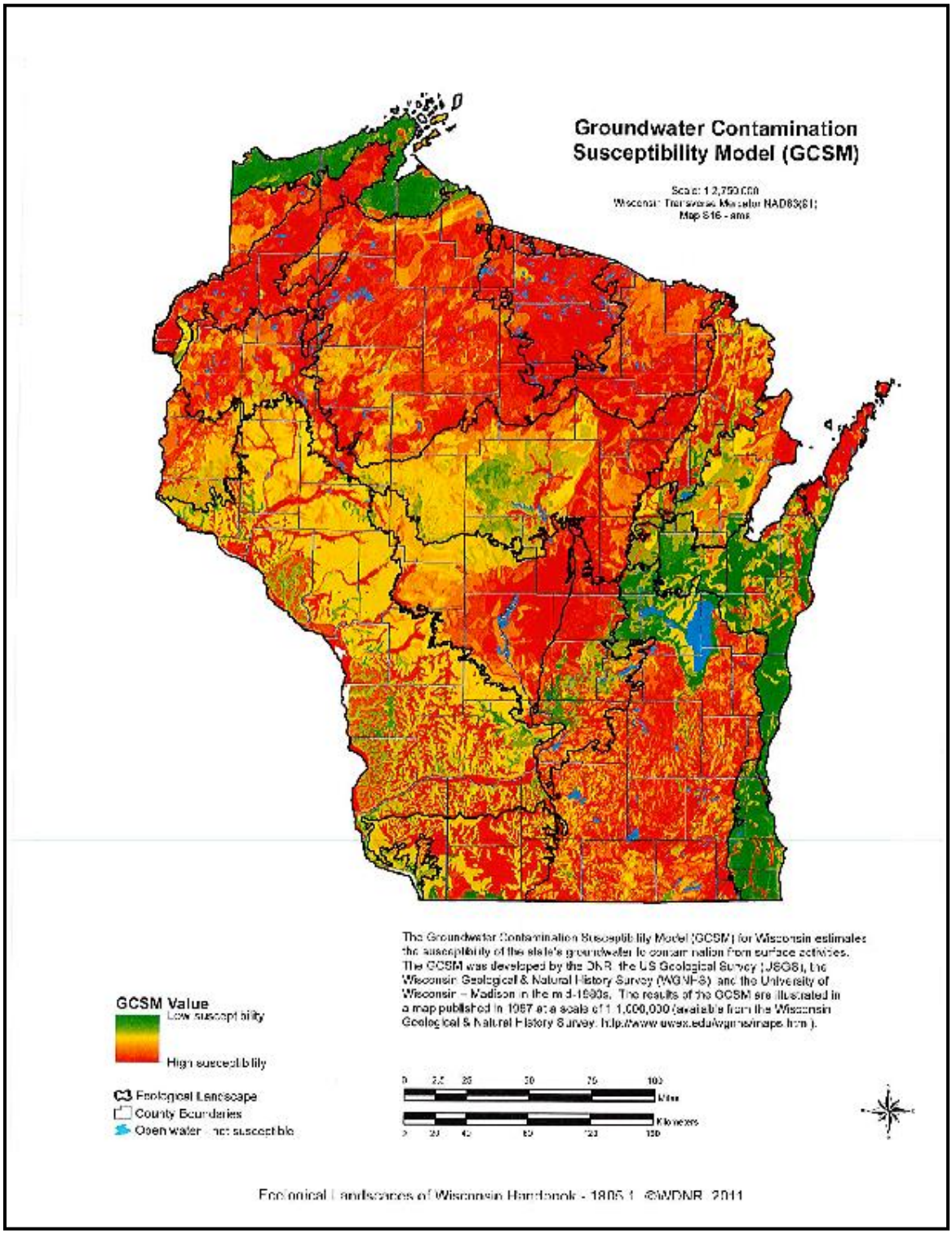
Groundwater originates as rain or snow. As precipitation falls on the earth's surface, some evaporates, some runs off over land into lakes and streams and some soaks into the ground to become groundwater. The composition of soil—clay, loam, silt, sand or rock—generally determines the amount of groundwater and the depth at which it is found in a given area.

Percolating groundwater can also carry human-made pollutants. Contamination can be serious if groundwater contains substances that pose a health threat—bacteria, viruses, nitrate, metals such as mercury or lead, pesticides, petroleum and other synthetic or organic compounds. Carelessness and lack of understanding can lead to groundwater contamination from a variety of sources including:

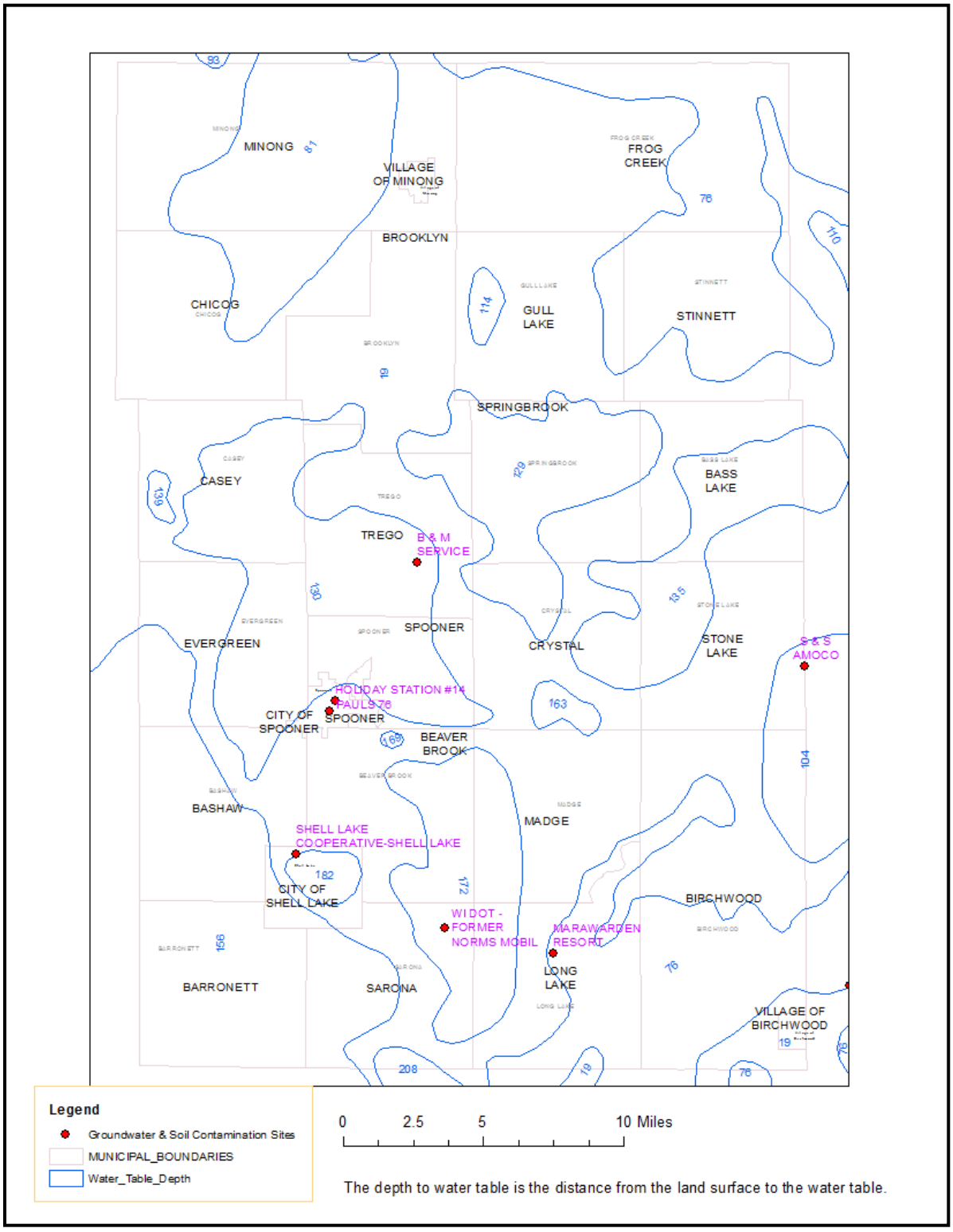
- leaking underground petroleum pipes and tanks
- use and storage of road salt
- improper use, disposal and storage of hazardous materials
- improper disposal of solid waste
- practices such as over-application of fertilizers and pesticides
- improper management of animal wastes
- improper treatment of human waste

Note: Washburn County is considered susceptible to groundwater contamination because of the predominance of sandy soils.

Map 4. Groundwater Susceptibility Map of Wisconsin



Map 5. Groundwater Table and Contaminated Sites



Above, sites where contaminants were present in groundwater at levels above state standards at the time of closure. Generally these are from leaking underground storage tanks, (LUST) often petroleum

The depth to water table is the distance from the land surface to the water table. The distance water must flow to reach the groundwater, combined with the ease with which movement occurs, play a significant role in determining the susceptibility of an area to contamination.

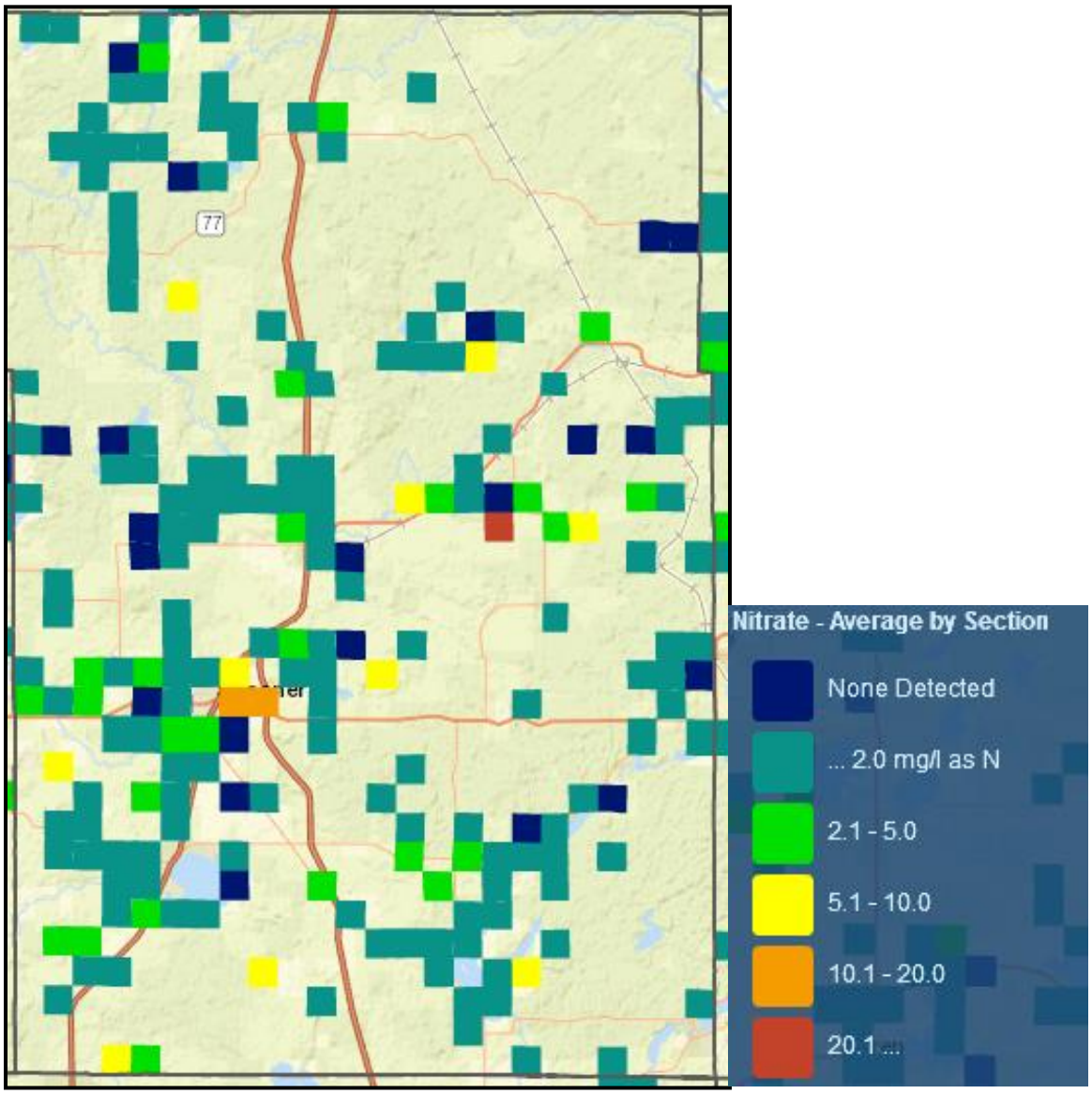
Nitrate

Nitrate can cause a condition called methemoglobenemia or “blue-baby syndrome” in infants under six months of age. Nitrite changes hemoglobin in blood (that part of the blood that carries oxygen to the body) to methemoglobin depriving the infant of oxygen causing the blue coloration.

Several investigators have studied the chronic health and reproductive impacts of nitrate contaminated drinking water. Recent studies have implicated nitrate exposure as a possible risk factor associated with lymphoma, gastric cancer, hypertension, thyroid disorder and birth defects. In addition, a recent investigation conducted by local public health officials in La Grange County, Indiana implicated nitrate-contaminated drinking water as the possible cause of several miscarriages (Schubert et.al., 1997).

Where people live and the depth of their ground-water supply determines the quality of the water they drink. Nitrate contamination generally decreases with increasing depth to ground water.

Map 6. Nitrate levels by Section



Nitrate Sources

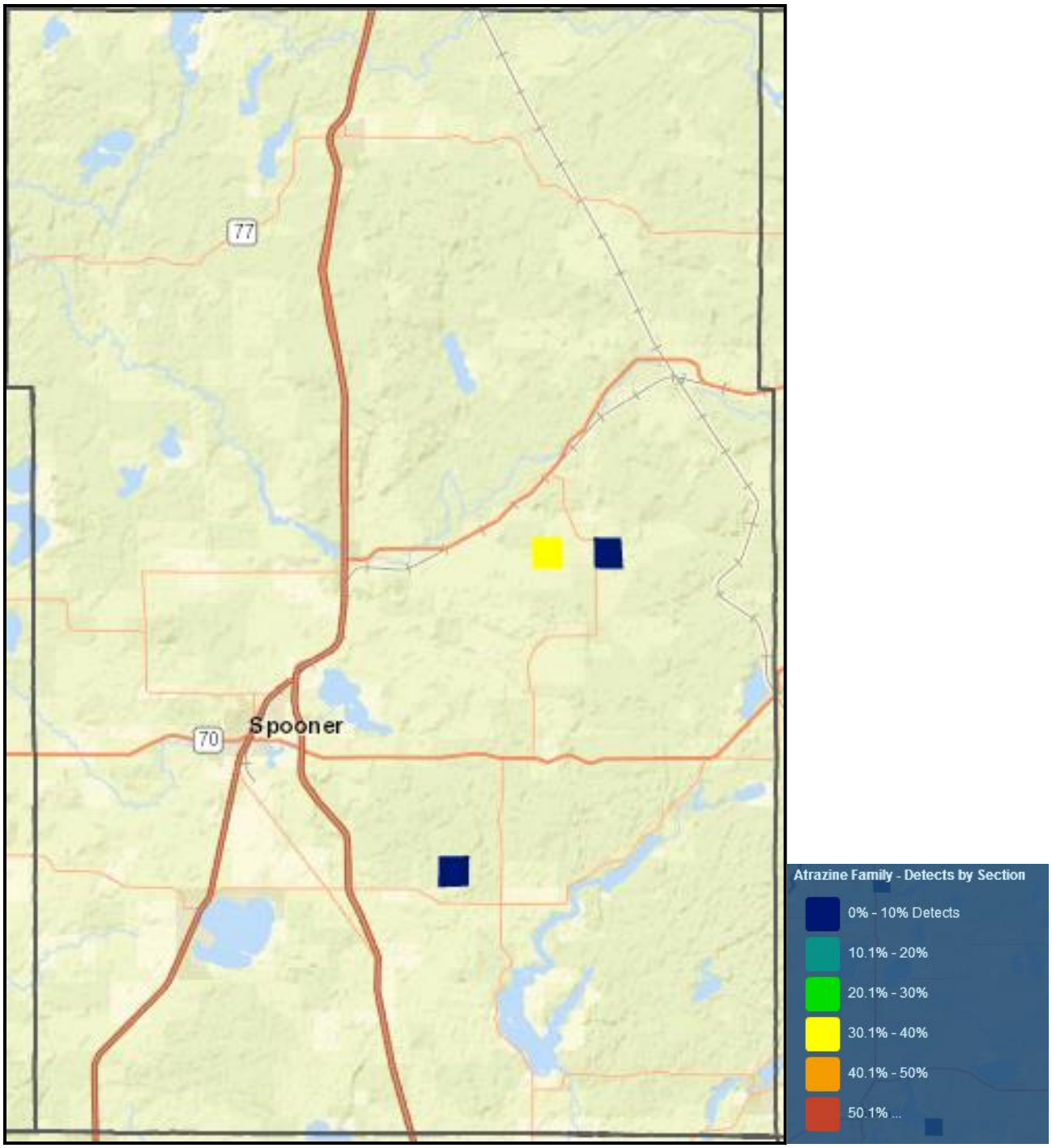
An estimated 2040 million pounds of nitrogen are deposited on Wisconsin's surface annually from agriculture, the atmosphere, septic systems and other sources (Shaw, 1994). Approximately 80% of this originates from agricultural sources divided almost equally among legumes, manure and commercial fertilizer. Another 18% of the nitrogen comes from atmospheric sources including combustion of gasoline in automobiles, and lightning. The remaining 2 % comes from septage, sludge disposal and other sources.

Atrazine family

Farmers have used it widely as a weed killer on corn fields since the early 1960s. In 1985, 77% of the acres of field corn and 49% of the acres of sweet corn in Wisconsin were treated with atrazine. A recent survey of rural Wisconsin wells found widespread atrazine contamination. Atrazine and its metabolites – substances formed as it breaks down in the environment – has been found to enter Wisconsin's groundwater from use on farm fields, spills or improper disposal. In most cases, the amounts detected did not pose a serious risk to health. Heath effects, atrazine has been classified as a "possible" cancer-causing agent. Long-term exposure may increase a women's risk of breast cancer. Additionally animal feeding studies indicate that exposure to high levels of atrazine over a long period of time causes tremors and heart and liver damage. However, these effects have not been seen in humans. Atrazine can cause a skin allergy. If an allergy develops, future contact with low levels of atrazine can cause itching and redness.

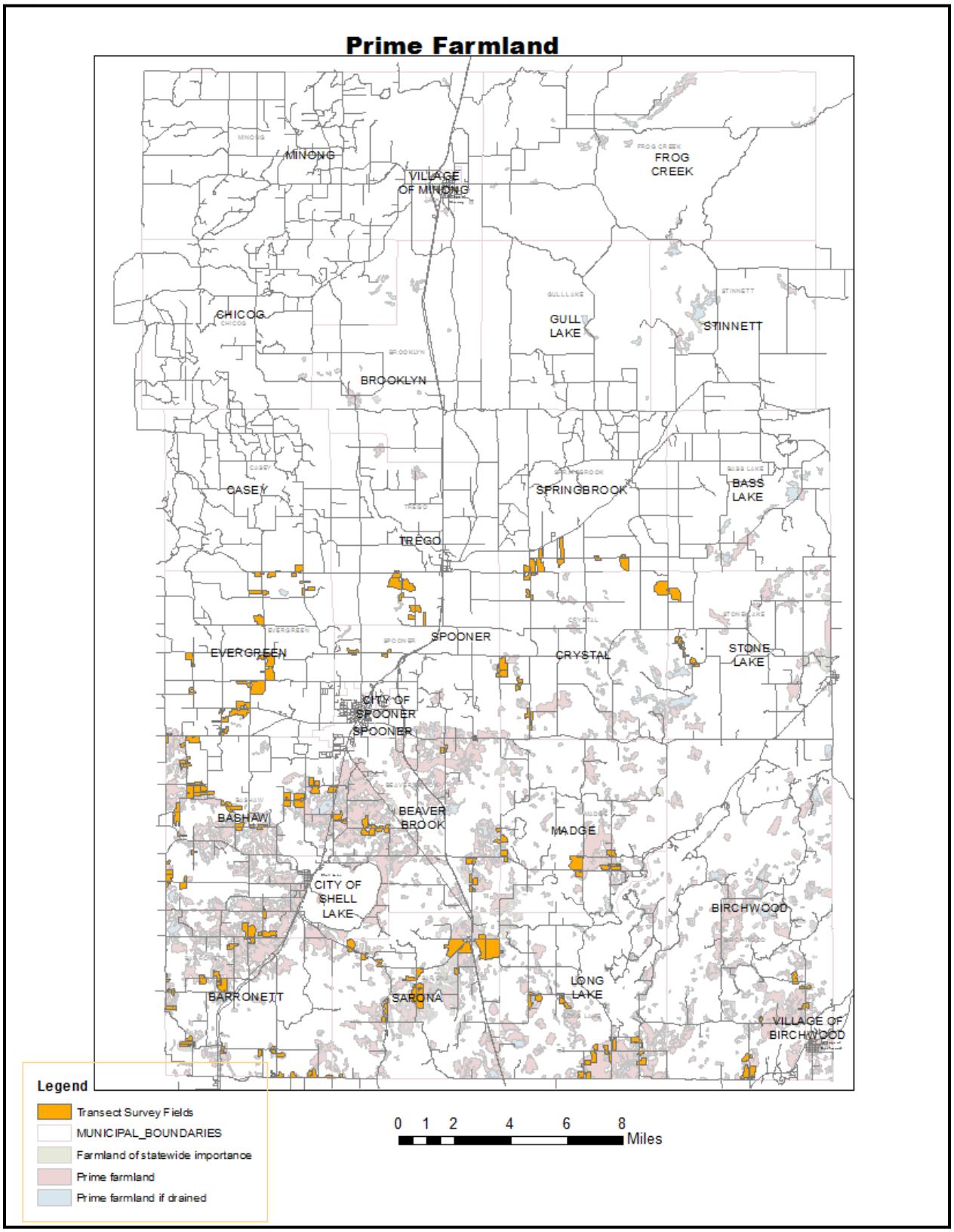
The Wisconsin Department of Agriculture, Trade and Consumer Protection has taken action to reduce atrazine use to prevent any more groundwater contamination. Today, we have restricted use of atrazine and is prohibited in some areas. Atrazine at 3 ppb level is called an "enforcement standard," which means that if found at that level, a move to prohibit its use in the area can be made. This is done through administrative rule, ATCP 30, or through administrative order.

Map 7. Atrazine detects from drinking wells

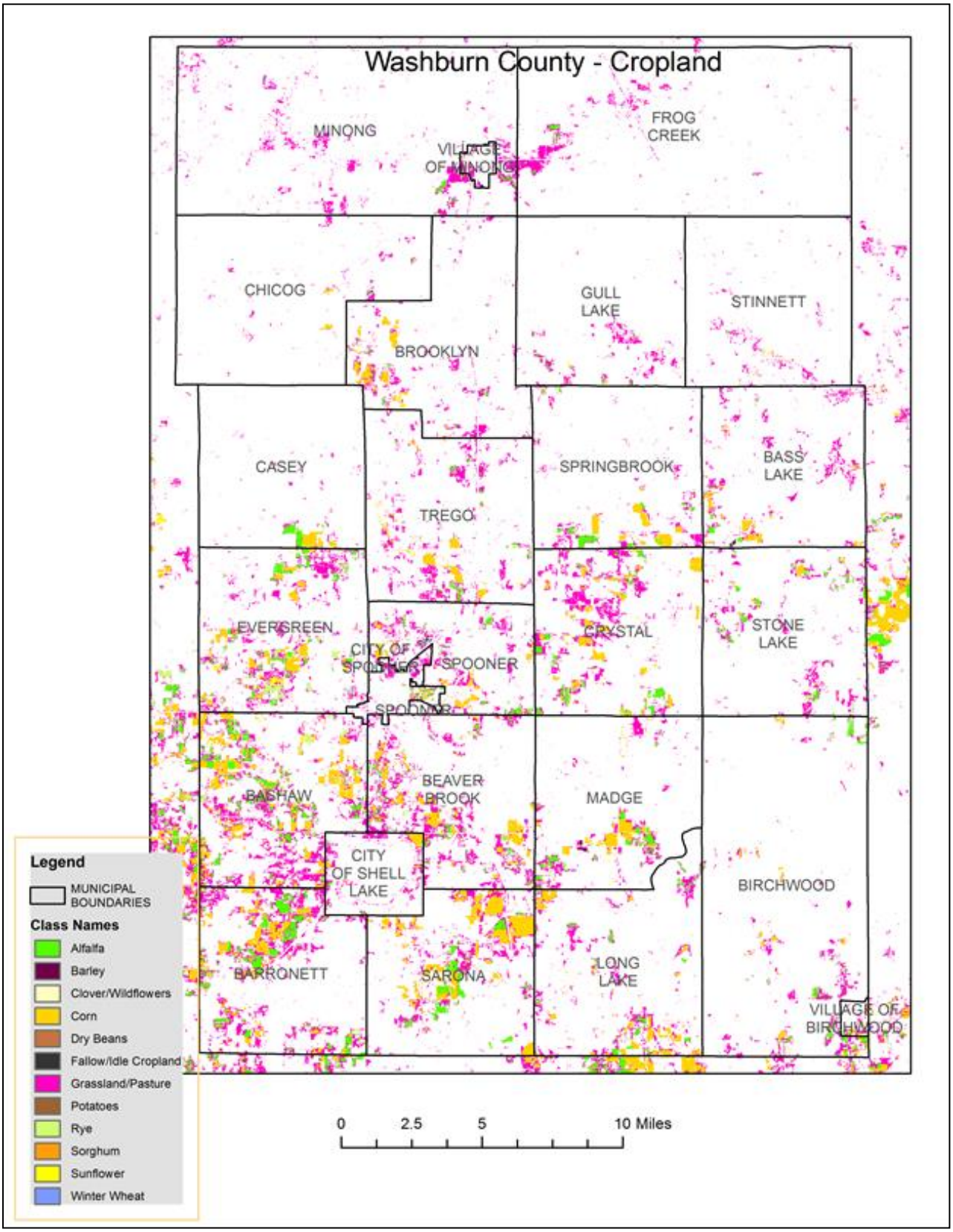


Resources Inventory: Cropland

Map 8. Prime Farmland of Washburn Co & Transect survey fields



Map 12. Washburn County 2015 Crops



Washburn County Agriculture Trends

Table 2. Crops & Crop Acreage, Total 28,033 acres (USDA National Agricultural Statistics Service)

Crop Acreage - Average for 2006 - 2016		
Crop	Acres	Percent
Corn	11407	43.51%
Soybeans	4618	17.61%
Hay	7419	28.29%
Spring Wheat	638	2.43%
Fallow/Idle Cropland	584	2.23%
Dry Beans	504	1.92%
Oats	390	1.49%
Rye	243	0.93%
Winter Wheat	195	0.74%
Sunflowers	99	0.38%
Clover/Wildflowers	46	0.18%
Barley	40	0.15%
Canola	15	0.06%
Potatoes	13	0.05%
Sweet Corn	5	0.02%
Sorghum	2	0.01%
Flaxseed	2	0.01%

Table 3. Farms, Acres and Agronomics (USDA National Agricultural Statistics Service)

Washburn County	2012	2007	2002	% change (2002 to 2012)
Number of Farms	405	558	471	-14.0%
Land in Farms	87,387 acres	101,862 acres	105,432 acres	-17.1%
Average Size of Farm	216 acres	183 acres	224 acres	-3.6%
Market Value of Products Sold	$32,519,000	$19,760,000	$17,127,000	89.9%
2007 - Crop Sales $5,055,000 (26 percent)				
2007 - Livestock Sales $14,705,000 (74 percent)				
2012 - Crop Sales $15,636,000 (48 percent)				
2012 - Livestock Sales $16,883,000 (52 percent)				

Table 4. Cattle (USDA National Agricultural Statistics Service)

Years	Number of cows	Milk per cow	# Herds	ALL CATTLE AND CALVES
2010	2,700	20,400	32	10,800
2011	2,800	20,400	30	10,200
2012	2,800	20,400	30	10,800
2013	2,800	21,300	23	8,100
2014	2,500	21,800	21	8,400
2015	2,400	21,800	20	8,400

Washburn County Agriculture Trends – Cropland

Table 5. Corn Production (USDA National Agricultural Statistics Service)

Northwest Area Barron, Bayfield, Chippewa, Douglas, Polk, Rusk, Sawyer and Washburn County

Corn Grain - FIELD CROP SUMMARY								
	Wisconsin			Washburn				
Year	Yield per acre Bushells	Value Per Bushell $	Per Acre Value	Yield per acre Bushells	Per Acre Value	Corn Planted Acres	Value Washburn	NW Yield
2007	135	$4.11	$554.85					
2008	137	$3.89	$532.93					
2009	153	$3.57	$546.21					
2010	162	$5.27	$853.74	150	$790.50	10,600	$8,379,300.00	159
2011	155	$6.02	$933.10	138	$830.76	10,700	$8,889,132.00	145
2012	120	$6.69	$802.80	127	$848.96	10,800	$9,168,778.80	126
2013	145	$4.38	$635.10	82	$360.47	11,600	$4,181,498.40	104
2014	156	$3.67	$572.52	97	$354.89	8,450	$2,998,812.05	149
2015	164	$3.40	$557.60	158	$537.20	11,500	$6,177,800.00	158
Average	147.4	$4.56	$665.43	125	$620.46	10,608	$6,632,553.54	140

Table 6. Corn Silage Production (USDA National Agricultural Statistics Service)

Northwest Area Barron, Bayfield, Chippewa, Douglas, Polk, Rusk, Sawyer and Washburn County

CORN FOR SILAGE Washburn			
	Acres	**Yield Ton/Acre - Washburn County**	**Yield Ton/Acre - Northwest Area**
2010	2,500	19	19
2011	2200	19	20
2012	3,100	15	15.5
2013	2,400	15	13.5
2014	2,750	14.5	17
2015	2,720	20	18
AVG	2,612	17.1	17.2

Table 7. Soybean Production (USDA National Agricultural Statistics Service)

NW - Northwest Area Barron, Bayfield, Chippewa, Douglas, Polk, Rusk, Sawyer and Washburn County

SOYBEANS FOR BEANS - FIELD CROP SUMMARY						
	WI - Yield per acre Bu	NW Yield	Washburn Co. Yield	Per Bu $	Per Acre	Panted Acres
2007	41					
2008	35					
2009	40					
2010	51	46	47	$10.80	$545.40	5,300
2011	47	40	42	$11.70	$549.90	5,100
2012	42	36	34	$14.00	$588.00	6,600
2013	39	22	23	$12.80	$499.20	6,670
2014	44	32	33	$10.00	$440.00	5,800
2015	50	46	44	$8.50	$420.75	NL
Average	43	37	37	$11.30	$507.21	5,894

Table 8. Alfalfa & Hay Production (USDA National Agricultural Statistics Service)

ALFALFA HAY (DRY): Washburn (Note: 2014 not listed)				
	Harvested Acres	**Yield Tons/Acre**	**$/Ton**	**Per Acre $**
2010	6,100	2.6	116	$301.60
2011	6,100	2.8	188	$526.40
2012	6,340	1.75	208	$364.00
2013	6,630	1.85	151	$279.35
2015	7,800	2.05	98.5	$201.93
AVG	6,594	2.21	152.3	$334.66
ALL OTHER HAY (DRY): Washburn (Note: 2011-12 not listed)				
	Harvested	**Yield Tons/Acre**	**$/Ton**	**Per Acre $**
2010	9,400	1.7	106	180
2013	7,650	1.55	192	298
2014	7,740	1.6	143	229
2015	4,130	1.6	91	146
AVG	7,230	1.6	133	213

Table 9. Crop Yields Washburn Co (USDA-NASS)

NW - Northwest Area Barron, Bayfield, Chippewa, Douglas, Polk, Rusk, Sawyer and Washburn County

Crop Yields			
	Washburn Co. Avg	State Avg	NW Avg
Corn Grain Bu/Ac	125	148	140
Soybeans for Beans Bu/Ac	43	37	37
Oats Bu/AC	60	64	60
Winter Wheat Bu/Ac	47	67	47
Barley		51	
Corn Silage Tons	17.1		
Alfalfa Hay dry	2.21		
Hay Other dry	1.6		

Setting Goals for Water Protection

The Federal Water Pollution Control Act of 1948 was the first major U.S. law to address water pollution. Growing public awareness and concern for controlling water pollution led to sweeping amendments in 1972. As amended in 1972, the law became commonly known as the Clean Water Act (CWA).

The 1972 amendments:

- Established the basic structure for regulating pollutant discharges into the waters of the United States.
- Gave EPA the authority to implement pollution control programs such as setting wastewater standards for industry.
- Maintained existing requirements to set water quality standards for all contaminants in surface waters.
- Made it unlawful for any person to discharge any pollutant from a point source into navigable waters, unless a permit was obtained under its provisions.
- Funded the construction of sewage treatment plants under the construction grants program.
- Recognized the need for planning to address the critical problems posed by *nonpoint source pollution.*

Under the Clean Water Act, every state adopted water quality standards to protect, maintain and improve the quality of its waters.

For Wisconsin water quality standards to protect, maintain and improve the quality of its water are contained within WI. Stats. CHAPTER 281, WATER AND SEWAGE.

The Wisconsin Department of Natural Resources (WDNR) promulgated rules setting standards of water quality to be applicable to the waters of the state, recognizing that different standards may be required for different waters or portions thereof. Water quality standards shall consist of the designated uses of the waters or portions thereof and the water quality criteria for those waters based upon the designated use. Water quality standards shall protect the public interest, which include the protection of the public health and welfare and the present and prospective future use of such waters for public and private water systems, propagation of fish and aquatic life and wildlife, domestic and recreational purposes and agricultural, commercial, industrial and other legitimate uses. In all cases where the potential uses of water are in conflict, water quality standards shall be interpreted to protect the general public interest.

These standards set the appropriate level of protection by:

1. ***Establishing designated uses - determine the types of activities the water should support***
2. ***Establishing water quality criteria standards - to protect these uses from excess pollution.***
    a. ***(WQBELS) Water quality-based effluent limitations or,***
    b. ***(TMDL) Total Maximum Daily Loads – EPA approved***
3. ***Established an antidegradation policy to maintain and protect existing uses and high quality waters***
4. ***Identify general policies to implement these protection levels in point source discharge permits***

DESIGNATED USES ARE:

1.) Fish and Aquatic Life,

   a) Subcategories for Streams & Rivers - Cold Water, warm Water Sport Fish, Warm Water Forage Fish, Limited Forage, and Limited Aquatic Life

   b) Subcategories for Lakes - Shallow Seepage, Shallow Headwater, Shallow Lowland, Deep Seepage, Deep Headwater, Deep Lowland, Small Lakes, Spring Ponds, Two-Story Lakes, and Reservoirs

2.) Recreation,

3.) Public Health and Welfare,

4.) Wildlife.

WATER QUALITY STANDARDS

Are found in the following Wisconsin administrative rules:

1. (NR 102) WISCONSIN SURFACE WATERS
2. (NR 103) WATER QUALITY STANDARDS FOR WETLANDS
3. (NR 104) USES AND DESIGNATED STANDARDS FOR
   a. Intrastate Waters
   b. Interstate Waters
4. (NR 105) SURFACE WATER QUALITY CRITERIA AND SECONDARY VALUES FOR TOXIC SUBSTANCES
5. (NR 140) GROUNDWATER QUALITY

- Water Quality-Based Effluent Limitations (WQBELS) or B. TMDL

Water quality-based effluent limitations are calculated in order to insure that discharges to waters of the state are in compliance with water quality standards. Chapter NR 106 of the Wisconsin Administrative Code addresses how to calculate water quality-based effluent limitations, and also includes the procedures for determining when it is necessary to include those limitations in permits for discharges to rivers, lakes, drainageways, wetlands, or other surface waters in the State of Wisconsin.

Water Quality-Based Effluent Limitations (WQBELS) Equation

$$\text{Limitation} = [(WQC)(Qs + (1-f)Qe) - (Qs - fQe)(Cs)]/Qe$$

Where:

Limitation = Water quality based effluent limitation

WQC = the water quality criterion concentration

Qs = Receiving water design flow

Qe = Effluent flow

f = Fraction of the effluent flow that is withdrawn from the receiving water

Cs = Upstream concentration

➢ Total Maximum Daily Loads (TMDL- U.S. EPA approved)

A TMDL is developed after consideration of all sources of pollution to an impaired waterbody and is stated as the amount of pollutant that the waterbody can assimilate and not exceed water quality standards. TMDL pollutant loads are determined in consideration of in-water targets that must be met for the waterbody to respond favorably. Targets may be based on promulgated numeric water quality criteria or may be based on narrative criteria developed in consideration of local data and/or nearby reference sites.

Once targets are set for the waterbody, the TMDL is established by allocating the allowable load between the point sources (WLA) and the nonpoint sources (LA) with some amount of the total load set aside as a margin of safety (MOS). The three components that make up a TMDL= WLA + LA + MOS.

WLA – The waste load allocation (WLA) is the total allowable pollutant load from all point sources (e.g. municipal, industrial, CAFOs, MS4 stormwater). Reserve capacity may either be built into the WLA or be a separate component of the total loading capacity to allow for future growth in the watershed.

LA – The load allocation (LA) is the allowable pollutant load from nonpoint sources (agricultural, CAFO off-site land-spreading, residential runoff, etc.). Natural sources (e.g., runoff from non-disturbed areas) are typically covered under the load allocation, and whenever possible ***nonpoint source loads and natural background loads should be distinguished***.

MOS - The margin of safety (MOS) accounts for uncertainty in modeling and calculating WLAs and LAs.

Once the TMDL is developed and approved, federal and state regulations then require implementation of TMDLs to meet water quality standards where there are implementation mechanisms in place and supported by law. For point source discharges, WLAs delineated in the TMDL needs to be expressed in Wisconsin Pollutant Discharge Elimination System (WPDES) permits.

Relationship of WQBELs and TMDL based limitations.

When deciding whether to use a TMDL based limit as a substitute for the limitations calculated under (WQBELS) the WDNR shall consider the following factors:

1.) The degree to which nonpoint sources contribute phosphorus to the impaired water;

2.) Whether waters upstream of the impaired waters are meeting the phosphorus criteria; and

3.) Whether waters downstream of the impaired water are meeting the phosphorus criteria.

- If the phosphorus limitation based on an approved TMDL is less stringent than the water quality based effluent limitation the WDNR may include the TMDL based limit instead of WQBELS.
- If a phosphorus water quality based limit calculated under WQBELS has already taken effect in a permit, the department may replace the limit with a less stringent TMDL based limit, if allowed pursuant to antidegradation procedures in Ch. NR 207.

Note: The TMDL based limitation may be less stringent than the water quality based effluent limitation calculated in cases where nonpoint sources are the significant phosphorus sources responsible for the impairment.

Note: If the phosphorus limitation based on an approved TMDL is more stringent than the water quality based effluent limitation calculated WQBELS, the WDNR shall include the more stringent TMDL based limitation in the WPDES permit.

Outstanding and Exceptional Resource Waters

These designations are intended to meet federal Clean Water Act obligations requiring Wisconsin to adopt an antidegradation policy that is designed to prevent any lowering of water quality – especially in those waters having significant ecological or cultural value. Wisconsin has designated many of the state's highest quality waters as Outstanding Resource Waters (ORWs) or Exceptional Resource Waters (ERWs). Waters designated as ORW or ERW are surface waters which provide outstanding recreational opportunities, support valuable fisheries and wildlife habitat, have good water quality, and are not significantly impacted by human activities. ORW and ERW status identifies waters that the State of Wisconsin has determined warrant additional protection from the effects of pollution. For some higher quality waters, new or increased ***discharges are either prohibited or allowed only in extreme and unique situations***.

Of Wisconsin's 15,000 lakes and impoundments, 103 are designated as ORW—fewer than 1%

Outstanding Resource Waters (ORWs) (listed in Chapter NR 102 of the Wis. Adm. Code) typically do not have any point sources discharging pollutants directly to the water (for instance, no industrial sources or municipal sewage treatment plants), though they may receive runoff from nonpoint sources. New discharges may be permitted only if their effluent quality is equal to or better than the background water quality of that waterway at all times—no increases of pollutant levels are allowed.

Exceptional Resource Waters (ERWs) - if a waterbody has existing point sources at the time of designation, it is more likely to be designated as an ERW. Like ORWs, dischargers to ERW waters are required to maintain background water quality levels; however, exceptions can be made for certain situations when an increase of pollutant loading to an ERW is warranted because human health would otherwise be compromised.

Waters designated for Fish and Aquatic Life uses

The extent or allowance of a new or increased discharge depends on the results of the following demonstrations where applicable:

1. If new limits are not needed to regulate the discharge, the discharge permit cannot be changed.
2. If the new or increased discharge results in any lowering of water quality, the discharger must demonstrate to DNR that the discharge accommodates important social or economic development. This may include a showing of increased employment, increased production, avoiding reductions in employment, increased efficiency, economic or social benefit to the community including industrial, commercial, or residential growth. If the social or economic demonstration cannot be made, no additional lowering of water quality will be permitted.
3. If the new or increased discharge would exceed 1/3 of the allowable and available capacity of a pollutant in a water body, the discharger must demonstrate whether or not the significant lowering can be prevented in a cost effective manner or if the significant lowering can be prevented by discharging to a different location.

Map 10. Outstanding & Exceptional Lakes of Washburn Co.

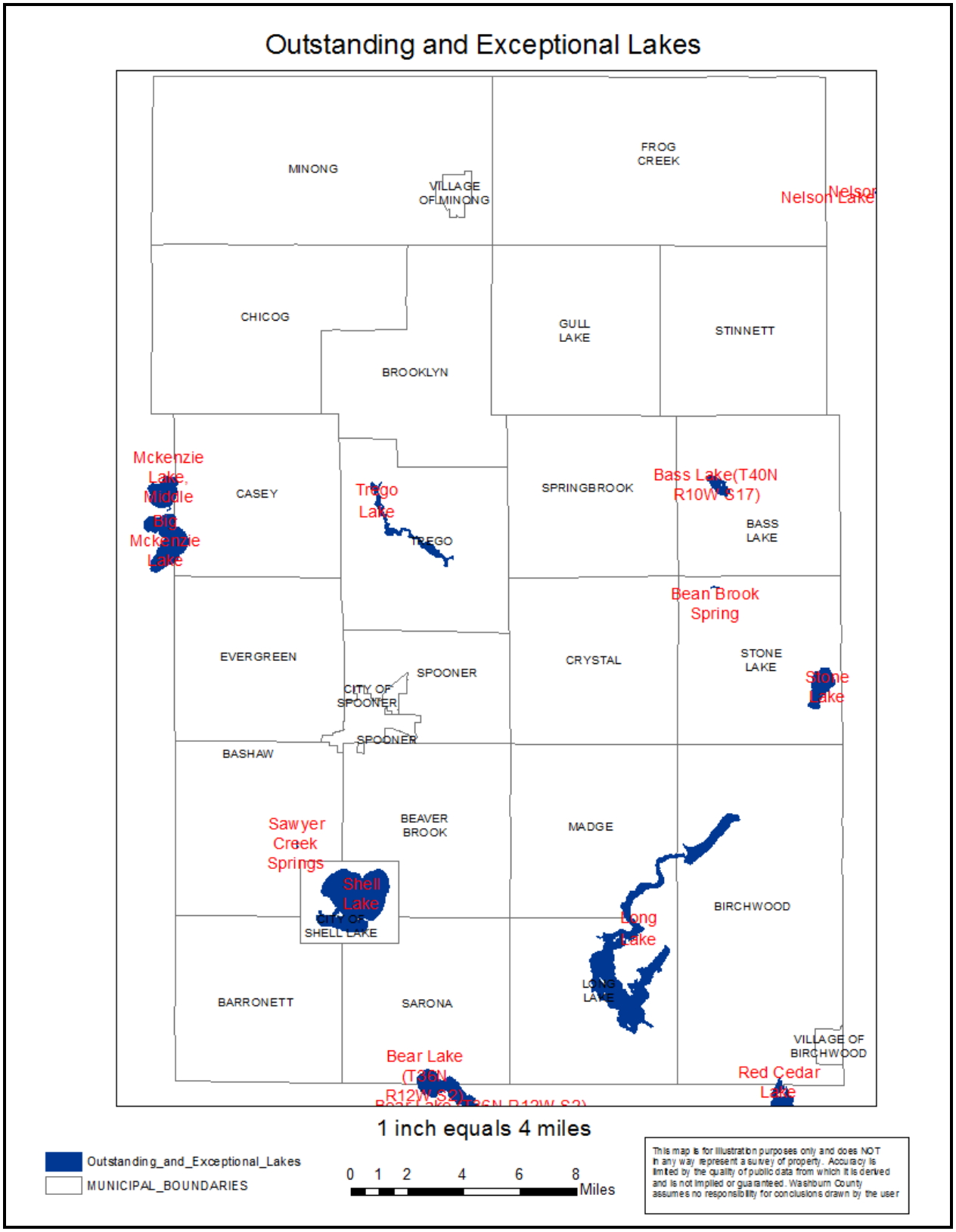


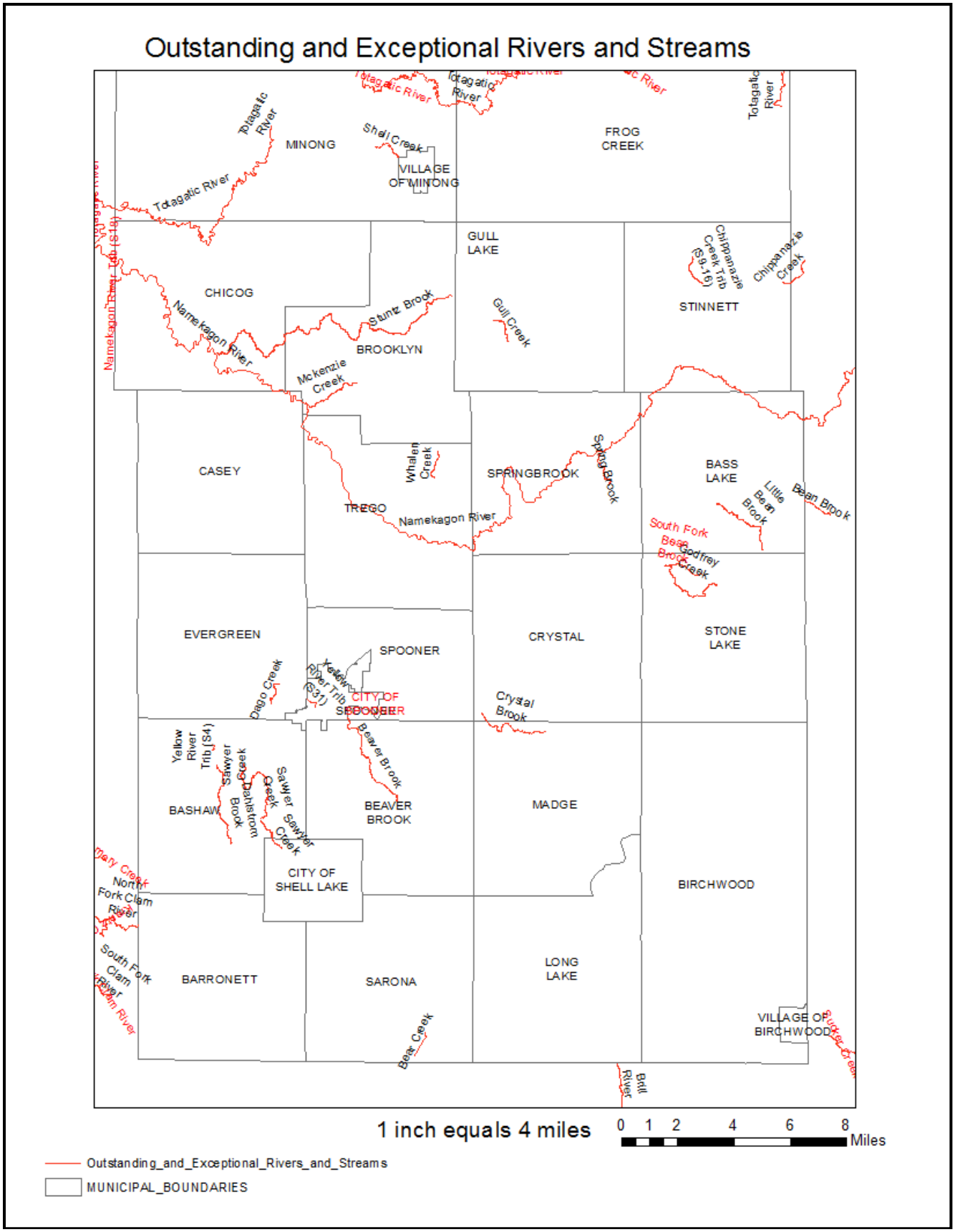
Table 10. Lakes designated as Outstanding Resource Waters

Local Waterbody Name	ORW/ERW	Watersheds	Code Reference
Trego Lake	ORW	SC21	102.10(1)(a)2
South Fork Bean Brook	ORW	SC21	102.10(1)(f)23
Bear Lake (T36N R12W S2)	ORW	LC10	102.10(1m)2
Red Cedar Lake	ORW	LC11	102.10(1m)2
Bass Lake(T40N R10W S17)	ORW	SC21	102.10(1m)20
Long Lake	ORW	LC10	102.10(1m)20
Mckenzie Lake, Middle	ORW	SC19	102.10(1m)20
Shell Lake	ORW	SC15	102.10(1m)20
Stone Lake	ORW	UC20	102.10(1m)20
Big Mckenzie Lake	ORW	SC19	102.10(1m)4

Table 11. Rivers & Streams Outstanding and Exceptional Resource Waters

Local Waterbody Name	ORW/ERW	Watersheds	Code Reference	Start Mile	End Mile	Mileage
Bear Creek	ORW/	LC10	102.10(1)(f)23m	14.6	15.61	1.01
Beaver Brook	ORW/	SC15	102.10(1)(f)23	0	4.42	4.42
Chippanazie Creek	/ERW	SC21	102.11(1)(a)	8.65	10.18	1.53
Chippanazie Creek Trib (S9-16)	/ERW	SC21	102.11(1)(a)	0	1.41	1.41
Crystal Brook	/ERW	SC15	102.11(1)(a)	0	4	4
Dago Creek	/ERW	SC15	102.11(1)(a)	0	1.21	1.21
Dahlstrom Brook	/ERW	SC15	102.11(1)(a)	0	3.81	3.81
Godfrey Creek	/ERW	SC21	102.11(1)(a)	0	3.39	3.39
Gull Creek	/ERW	SC21	102.11(1)(a)	7.52	8.81	1.29
Little Bean Brook	/ERW	SC21	102.11(1)(a)	0	3.41	3.41
Mckenzie Creek	/ERW	SC19	102.11(1)(a)	0	2.55	2.55
Namekagon River	ORW/	SC19,SC21,SC22	102.10(1)(a)2	31	68.36	37.36
Namekagon River	ORW/	SC17,SC19	102.10(1)(a)2	0	31	31
Namekagon River Trib (S18)	/ERW	SC19	102.11(1)(a)	0	0.34	0.34
North Fork Clam River	ORW/	SC13	102.10(1)(d)4	27.86	32.79	4.93
Sawyer Creek	ORW/	SC15	102.10(1)(f)23	1.32	5.01	3.69
Sawyer Creek	ORW/	SC15	102.10(1)(f)23	0	1.32	1.32
Sawyer Creek	ORW/	SC15	102.10(1)(f)23	5.08	6.58	1.5
Sawyer Creek Springs	ORW/	SC15	102.10(1)(f)23	null	null	0
Shell Creek	/ERW	SC20	102.11(1)(a)	3.33	4.69	1.36
Spring Brook	/ERW	SC21	102.11(1)(a)	0	1.47	1.47
Stuntz Brook	ORW/	SC19	102.10(1)(f)23	0	16.32	16.32
Totagatic River	ORW/	SC20	102.10(1)(a)5	24.04	48.81	24.77
Totagatic River	ORW/	SC20	102.10(1)(a)5	50.11	58.43	8.32
Totagatic River	ORW/	SC19	102.10(1)(f)2p	0	17.51	17.51
Totagatic River	ORW/	SC20	102.10(1)(f)2p	58.43	58.53	0.1
Totagatic River	ORW/	SC20	102.10(1)(f)2p	23.65	24.04	0.39
Totagatic River	ORW/	SC20	102.10(1)(f)2p	49.06	49.14	0.08
Totagatic River	ORW/	SC19	102.10(1)(f)2p	17.51	17.61	0.1
Whalen Creek	/ERW	SC21	102.11(1)(a)	3.22	4.38	1.16
Yellow River Trib (S31)	/ERW	SC15	102.11(1)(a)	0	0.61	0.61
Yellow River Trib (S4)	ORW/	SC15	102.11(1)(a)	0	0.36	0.36

Map 11. Washburn County Rivers and Streams designated as Outstanding & Exceptional Resource Waters



Policies to implement these protection levels in point source discharge permits

WISCONSIN POLLUTANT DISCHARGE ELIMINATION SYSTEM (WPDES)

The National Pollutant Discharge Elimination System (NPDES) permit program addresses water pollution by regulating point sources that discharge pollutants to waters of the United States. Created in 1972 by the Clean Water Act, the NPDES permit program is authorized to state governments by EPA to perform many permitting, administrative, and enforcement aspects of the program.

The Clean Water Act prohibits anybody from discharging "pollutants" through a "point source" into a "water of the United States" unless they have an NPDES permit. The permit will contain limits on what you can discharge, monitoring and reporting requirements, and other provisions to ensure that the discharge does not hurt water quality or people's health. In essence, the permit translates general requirements of the Clean Water Act into specific provisions tailored to the operations of each person discharging pollutants.

The term point source is also defined very broadly in the Clean Water Act because it has been through 25 years of litigation. It means any discernible, confined and discrete conveyance, such as a pipe, ditch, channel, tunnel, conduit, discrete fissure, or container. It also includes vessels or other floating craft from which pollutants are or may be discharged. By law, the term "point source" also includes concentrated animal feeding operations, which are places where animals are confined and fed. By law, agricultural stormwater discharges and return flows from irrigated agriculture are not "point sources"

Wisconsin's permit program was established by Chapter 283.13(1), Wisconsin Statutes. In Wisconsin, WPDES permits are issued by the DNR Bureau of Water Quality, with federal oversight from the US EPA.

As of mid-2017: 322 industrial waste facilities held individual WPDES permits & 641 municipal waste facilities held individual WPDES permits.

WPDES permits:

1. *Municipal wastewater (Individual site specific permit)*
2. *Industrial wastewater*
    a) *Individual permit*
        I. *Major*
        II. *Minor*
    b) *General permit*
3. Storm Water Permitting
    a) *Municipal Storm Water Sewer Systems (MS4s)*
    b) *Construction Site Storm Water*
    c) *Industrial Site Storm Water*
4. *Concentrated Animal Feeding Operations*

1. Municipal wastewater discharge facilities (Individual permit) - must be reviewed and approved by the DNR. Section 281.41, Wis. Stats requires DNR review of municipal and industrial treatment plant construction plans as well as related monitoring systems and groundwater monitoring wells.

Table 12. Municipal wastewater facilities – Washburn Co

Facility Name	City	County	Type
BIRCHWOOD VILLAGE OF	Birchwood	Washburn	Municipal WPDES
MINONG VILLAGE OF	Minong	Washburn	Municipal WPDES
SHELL LAKE CITY OF	Shell Lake	Washburn	Municipal WPDES
SPOONER CITY OF	Spooner	Washburn	Municipal WPDES

Note: the above listed facilities do not have outfalls to surface waters, therefore the discharge of phosphorous into their watersheds has not been determined.

2. Industrial wastewater discharge

a) Individual

I. **Individual Major industrial** - permits are issued for industries with significant wastewater volumes which can impact the receiving water. Majors are determined by calculating an EPA score which considers factors such as wastewater volume or stream flow, public health impacts, water quality, and more.

II. **Individual Minor industrial** -All other specific (individual) industrial permits are considered industrial minors. Minor industrial permits span a variety of industrial activities including dairy, food processing, metal finishing, meat processing and manufacturing plants. Many of the facilities have both surface water and groundwater discharges regulated by the same permit.

Table 13. Industrial wastewater – Washburn Co

Facility Name	Receiving Water	2009-2011 Avg. Point Source Load (P - lbs)	Total Load (P - lbs)	Point : Nonpoint Source Ratio (%)	Nonpoint Source Dominated?
WI DNR GOV TOMMY THOMPSON FISH HATCHERY	Yellow River	153	3643	4:96	Yes

Note: Phosphorous load is annual and is based on a three year average. Total load are estimate loads from the receiving water to this point.

b) General wastewater permits are specific categories of industrial, municipal and other wastewater discharges that are not a significant contributors of pollution and include:

Ballast Water Discharge
Carriage and Interstitial Water from dredging Operations
Concrete Products Operations
Contaminated Groundwater from Remedial Action Operations
Domestic Wastewater to a Subsurface Soil Absorption System
Hydrostatic Test Water and Water Supply System Water
Land Application of By-Product Solids
Land Application of Industrial Sludge
Land-spreading of Industrial Liquid Wastes
Non-Contact Cooling Water, or Condensate and Boiler Blowdown
Nondomestic Wastewater to a Subsurface Absorption System
Nonmetallic Mining Operations
Outside Washing of Vehicles Equipment and Other Objects
Pesticide Pollutant Discharges
Petroleum Contaminated Water
Pit/Trench Dewatering
Potable Water Treatment and Conditioning
Satellite Sewage Collection Systems
Short Duration Discharge, Swimming Pool Facilities

3. Storm Water Permitting

a) Municipal Separate Storm Sewer Systems (MS4s)

Storm water runoff is rain and melting snow that flows off building rooftops, driveways, lawns, streets, parking lots, construction sites, and industrial storage yards. Storm sewers are used to collect large amounts of runoff from streets and parking lots. More than two hundred municipalities in Wisconsin that include cities, villages, towns and counties within urbanized areas are required to have Municipal Separate Storm Sewer System (MS4) permits.

The MS4 permits require that municipalities develop a storm water management program that includes information and education of the public, illicit discharge detection and elimination, creation and enforcement of local ordinances to regulate erosion control and long-term storm water management, and implementation of pollution prevention at municipally-owned facilities. MS4 permits require implementation of best management practices for source-area control instead of numerical effluent limits. The MS4 permits are effective for a period of up to five years, at which point the permits are updated and re-issued.

In Wisconsin, MS4 permittees are also required to implement a reduction in total suspended solids (TSS) in runoff that enters waters of the state as compared to no controls. A municipality is required under s. NR 216.07(6) (b), Wis. Adm. Code, to provide an assessment of the actions taken to comply with the TSS performance standards. The initial assessment must include a pollutant-loading analysis using a model such as SLAMM, P8, or equivalent methodology that is approved by the DNR.

- About 245 municipalities in Wisconsin are currently required to have a Municipal Separate Storm Sewer System. A MS4 permit is required for a municipality that meets one of the following criteria:
- It is located within a federally-designated Urbanized Area
- Its population equals 10,000 or more based on the latest decennial census; or
- When the Department of Natural Resources designates the municipality for permit coverage in accordance with s. NR 216.025.

Note: At this time no municipalities within Washburn County are required to have a MS4 permit.

b) Construction site storm water permit

Construction projects requiring permit coverage include activities that disturb one acre or more of land through:

1. clearing;
2. grading;
3. excavating, or
4. stockpiling of fill material

Landowners must submit a Water Resources Application for Project Permits (WRAPP) to obtain construction site storm water permit from the DNR. Conditions of the permit includes developing an erosion control plan which addresses the discharge of sediment and other pollutants that are carried in runoff from the construction site. The plan details how to control sediment and other pollutants on the construction site by using control practices throughout the duration of the construction project and stabilization of the site. Erosion and sediment control Best Management

Practices (BMPs) include sediment ponds, tracking pads, silt fences and temporary seeding. Sequencing, inspection and maintenance procedures for BMPs must be included in the erosion control plan. (See page

Agricultural exemptions:

1. Planting, growing, cultivating and harvesting of crops for human or livestock consumption and pasturing or yarding of livestock, including sod farms and tree nurseries. This exemption does not include the construction of structures such as barns, manure storage facilities or barnyard runoff control systems.

2. Silviculture activities, including tree nursery operations, tree harvesting operations, reforestation, tree thinning, prescribed burning, and pest and fire control are not regulated by this NR21. Clearing and grubbing of an area of a construction site is not a silviculture activity.

c) Industrial storm water permit

Natural Resources Chapter 216, Wis. Adm. Code, (NR 216) lists certain types of industries in the state that need to obtain storm water discharge permits from the Department of Natural Resources. Permits are issued under a tiered system that groups industries by type and by how likely they are to contaminate storm water.

Tier 1 permits cover various "heavy" manufacturers such as paper manufacturing, chemical manufacturing, petroleum refining, ship building/repair, and bulk storage of coal, minerals and ores.

Tier 2 includes "light" industries that engage in activities that may contaminate storm water or have materials exposed to storm water. The potential for storm water exposure to industrial materials at these sites, while still a concern, is less than at Tier 1 sites.

The Tier 2 group includes:

i. Facilities engaged in food processing, furniture manufacturing, paper products, or electronics.

ii. Non-metallic mineral mining (e.g., sand, gravel, rock, and other aggregate).

iii. Transportation facilities with vehicle maintenance areas, and other industrial activities listed in NR 216.

iv. Designation for industrial facilities if the industry has no discharge of contaminated storm water.

4. Concentrated Animal Feeding Operation (CAFO)

A Wisconsin animal feeding operation with 1,000 animal units or more is a large Concentrated Animal Feeding Operation. Wisconsin DNR requires that CAFOs have a DNR approved Wisconsin Pollutant Discharge Elimination System (WPDES) permit in place before they can operate.

a. There is a "zero" discharge standard for runoff to navigable waters from CAFO animal production areas (areas where animals are housed or otherwise confined, manure is stored and feed is stored.

b. DNR reviews and approves plans and specifications for reviewable facilities (e.g. manure and process wastewater storage and handling systems).

c. CAFOs must be prepared for manure and non-manure spills by developing a response plan and must properly dispose of animal carcasses

d. Manure spread on land must be set back from drinking water wells, sinkholes and fractured bedrock.

e. Additional restrictions apply to manure and process wastewater spread on shallow soils over fractured bedrock.

f. Operators may not spread liquid manure on frozen or snow–covered ground unless it's injected or immediately incorporated into soil or there is an emergency outside the operation's control.

g. Operators may not spread solid manure on frozen or snow covered ground during February and March unless immediately incorporated. Farmers can stack solid manure in fields or store it in a designed structure during February and March.

h. Six months of liquid manure storage is required with some exceptions.

i. Nutrient management plan -

    1. A phosphorus-based nutrient management plan (NMP) that outlines the amounts, timing, locations, methods and other aspects related to land application of manure and process wastewater. Controlling P delivery is based on NRCS Standard 590 and, in most cases, allows operations to use either the Soil Test Phosphorus Strategy or the PI Strategy on a field-by-field basis.

    2. Nutrient management plans require:

        I. field soil testing reports done every four years or more frequently;
        II. planned and actual application rates, methods and timing for manure and process wastewater;
        III. field soil erosion and phosphorus delivery to surface waters calculations;
        IV. nutrient crediting, from manure, wastewater, organic matter, etc.;
        V. maps showing field-specific spreading restrictions and soils;
        VI. manure spreading field-specific reports and procedures; and
        VII. detailed plan narratives

j. There are also inspection, monitoring and reporting requirements

Table 14. Permit - Concentrated Animal Feeding Operation (CAFO)

Permittee Name	Address	Animal	Number of Animal Units	Proposed Number of Animal Units
Legacy Farms LLC	W8659 Woodyard Road, Shell Lake, WI 54871	Dairy Type	1852	2025

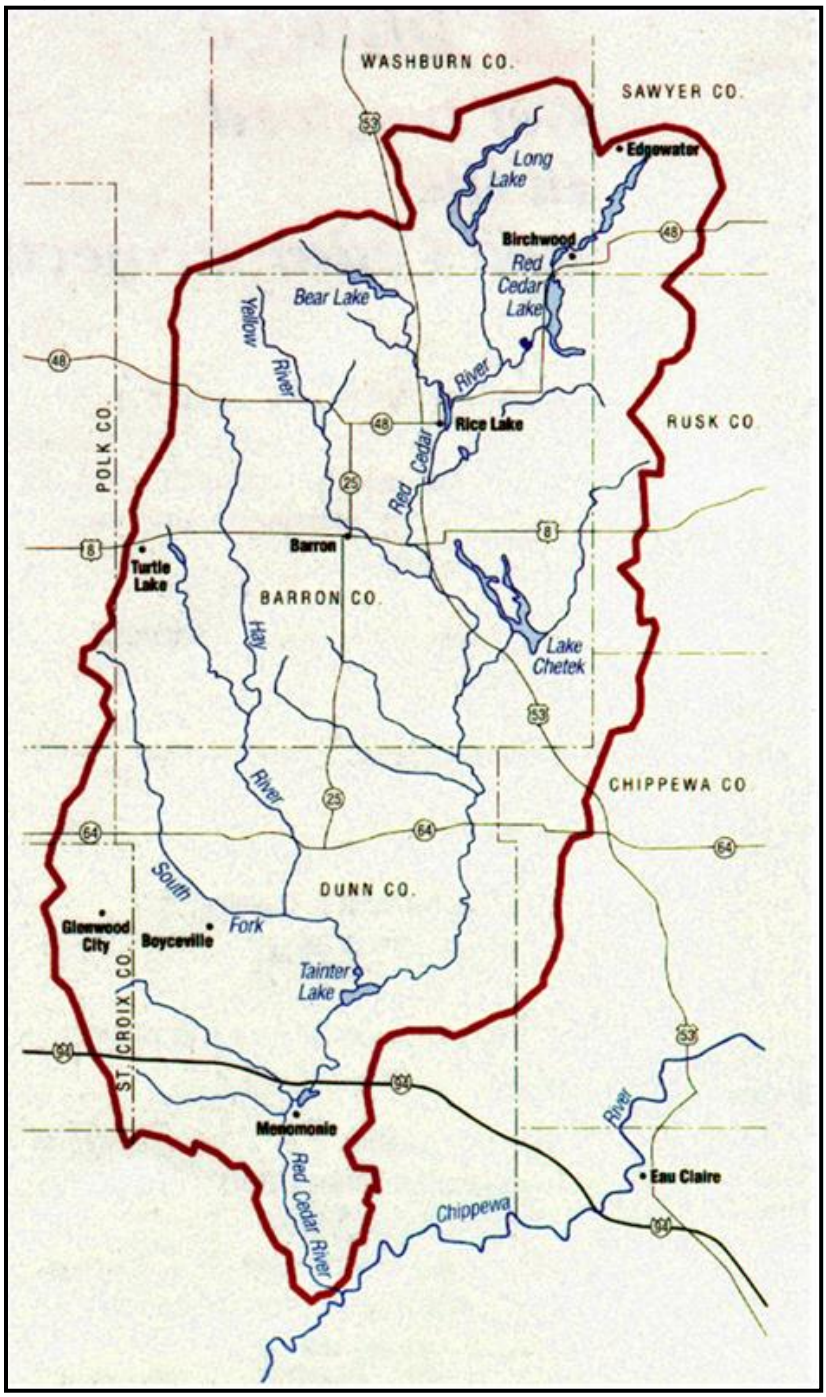
Note: As a point source there is a "zero" discharge standard for runoff to navigable waters from the animal production areas. The contribution to water pollution is based on typical crop production and animal waste utilization (field spreading) which contributes to non-point source pollution. Their Nutrient Management plan is jointly reviewed by the Land and Water Conservation Department and DNR staff. The basis of the county's review is through its animal waste ordinance.

Restoring Impaired Waters

Washburn County is in either the:

1. **Tainter Lake, Lake Menomin TMDL (approved in 2012) Impairment Phosphorous**
2. **Lake St. Croix TMDL (implemented in 2013) Impairment Phosphorous**

Map 12. Tainter Lake, Lake Menomin TMDL Area



1. TAINTER LAKE, LAKE MENOMIN TMDL (APPROVED IN 2012)

Phosphorus TMDLs for Lakes Menomin and Tainter were completed in May 2012 and approved by the EPA on September 14, 2012. These "lakes" are impoundments of the Red Cedar River (RCR). The RCR Basin is 1700

square miles in size and is located in west-central Wisconsin. The basin includes the following counties: Washburn, Sawyer, Barron, Rusk, Chippewa, St. Croix, and Dunn. ***Land use is primarily agriculture which contributes to excess phosphorus leading to recreational impairments*** (unsightly blue-green algal blooms that limit wading, swimming and boating) in Lake Menomin and Tainter Lake. This has led to a poor fish and macroinvertebrate community and reduced recreational use. ***The WDNR determined that phosphorus is the pollutant that must be addressed to reduce algal blooms and eutrophication to attain the recreational use.*** Reduction of the TP loads is expected to improve water quality and return the waterbodies to the appropriate designated uses.

The RCR originates from Long Lake and Lake Chetac and drains south and eventually enters Tainter Lake. Several smaller tributaries drain into Tainter Lake, the most significant is Hay River. Tainter Lake is a 1700 acre impoundment of the river, with a dam (the Cedar Falls Dam) at the downstream end of the impoundment. Outflow from Tainter Lake and Cedar Falls Dam flows south approximately 5 miles into Lake Menomin. Lake Menomin is a 1400 acre impoundment of the Red Cedar River (RCR), with a mean depth of 7.5 feet and a residence time of 5 days. A dam is located at the base of the lake, and is operated similarly to the Cedar Falls Dam. The lake is nearly surrounded by the City of Menomonie. Over 96% of the flow into Lake Menomin is from the RCR/Tainter Lake, with only a few small tributaries entering Lake Menomin.

WDNR identified numerous sources of TP in the basin. Point sources of TP in the basin include fourteen municipal wastewater treatment facilities (WWTF) and five industrial facilities. Phosphorus is a component of the effluent discharged from municipal WWTFs, and may be a component in industrial discharge. Two Municipal Separate Storm Sewer System (MS4) communities are present in the watershed, Menomonie and Rice Lake. The sstormwater discharge from MS4s can contain phosphorus from erosion of urban lands from sources such as lawn fertilizer, pet and animal waste, and other organic material. WDNR identified seven Concentrated Animal Feeding Operations (CAFOs) in the RCR Basin. The animal handling facilities at these CAFOs are not authorized to discharge pollutants under normal operations. Land application of manure from CAFOs is not included in the assumption of zero discharge. Rather, WDNR accounted for that loading of phosphorus in its calculation of the nonpoint source loads in the RCR Basin.

An implementation planning group has begun meeting, and WDNR identified several local groups that will be participating in the implementation efforts. The Implementation Plan will provide more specific details on funding, targeted sub basins, and opportunities for integrating existing efforts into a more cohesive plan.

Table 15. Phosphorous allocation (Taken from Tainter Lake TMDL Plan)

Table 4. TMDL for TP in Tainter Lake

Category	Current TP Loading (lbs/yr)	TMDL (lbs/yr)	TMDL (lbs/day)
Load Allocation	463,400	156,900*	**431***
Wasteload allocation	42,900	20,100	**55**
Total Loading Capacity	506,300	177,000	**486**

* - slightly revised from TMDL document

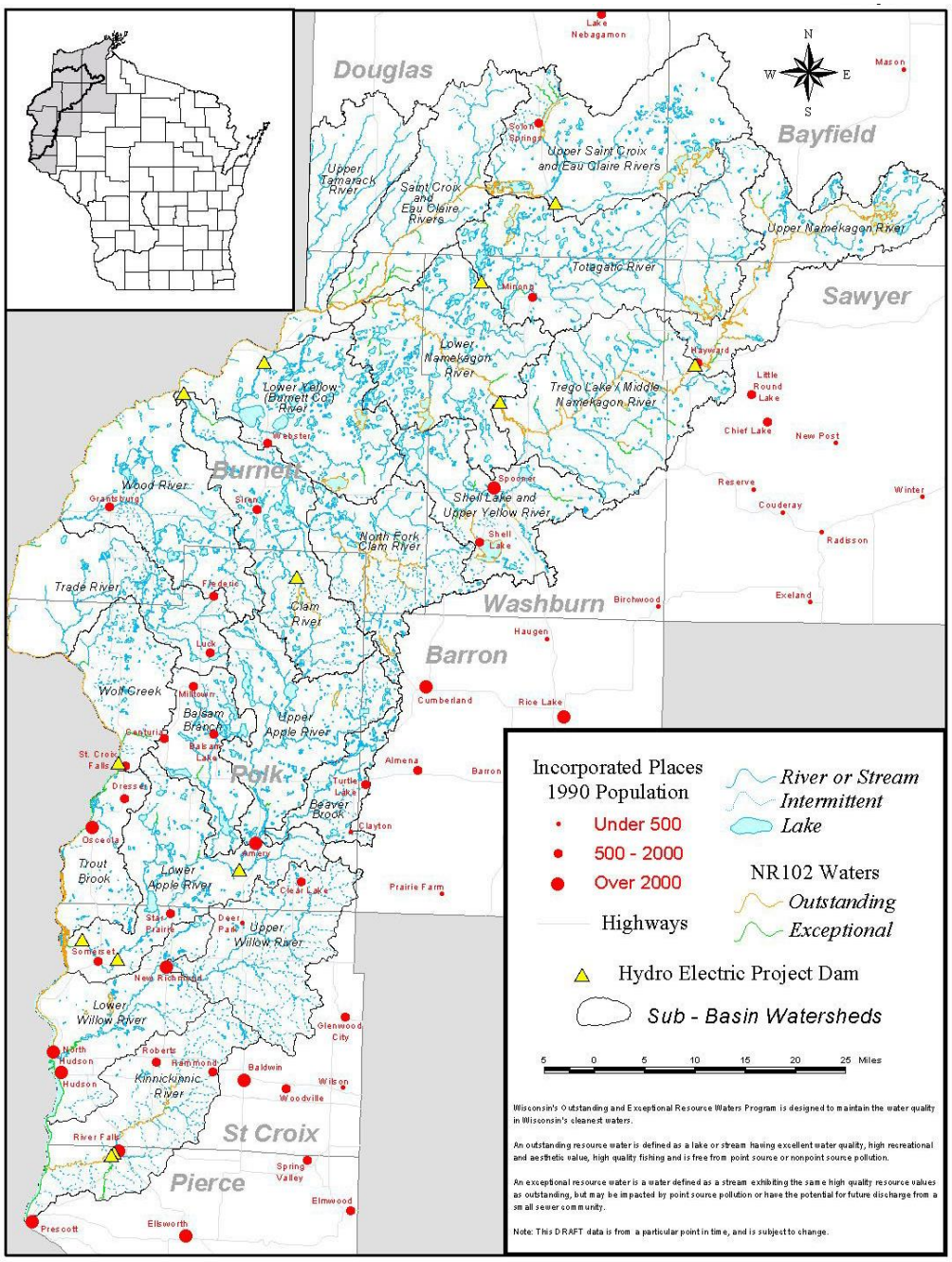
Table 5 TMDL for TP for Lake Menomin

Category	Current TP Loading (lbs/yr)	TMDL (lbs/yr)	TMDL (lbs/day)
Outflow from Tainter Lake	319,000	145,300	**398**
Load Allocation (direct watershed)	3500	2200	**6.2**
Wasteload allocation (MS4)	3500	2200	**6.1**
General WPDES Permits Wasteload allocation *		10	**0.028**
Total Loading Capacity	326,000	149,710	**411**

*Excluding CAFOs

❖ LAKE ST. CROIX TMDL (IMPLEMENTED IN 2013)

Map 13. Lake St. Croix TMDL



On April 6, 2006, an agreement was signed by Sheryl Corrigan, Commissioner of the Minnesota Pollution Control Agency (MPCA) and Mike Smith, Secretary, WDNR committing their agencies to work cooperatively ***to achieve the 20-percent phosphorus reduction goal. This goal formed the basis for the TMDL implementation efforts.***

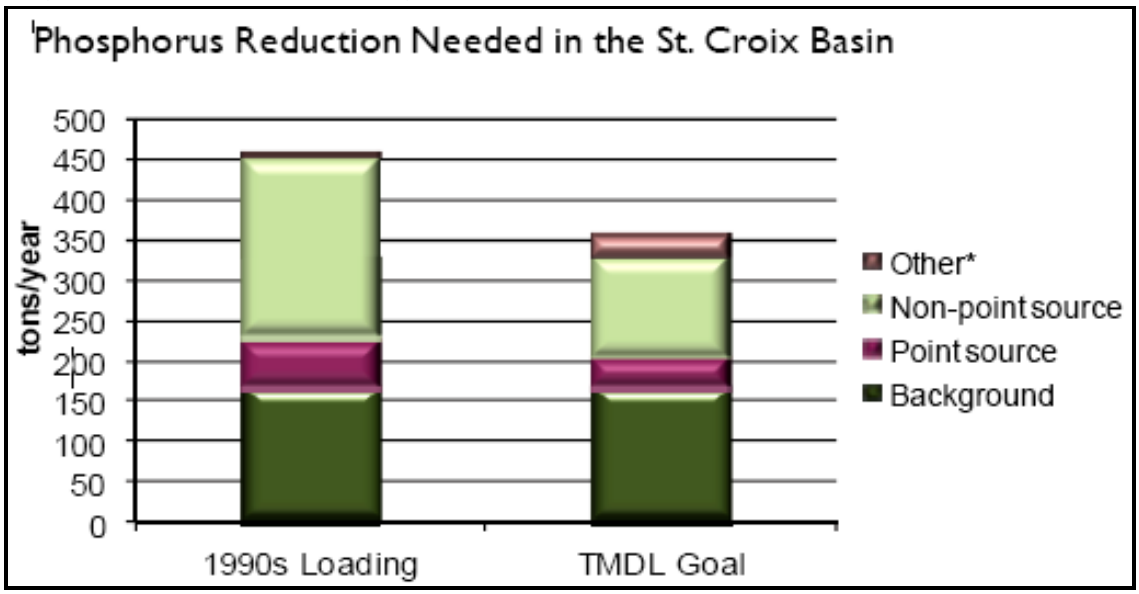
Lake St. Croix's phosphorus loading capacity was determined by means of historical concentration and load reconstructions, rather than by use of a water quality model, as in the large majority of TMDLs. The historical reconstructions spanned the period 1800 to 2000 and were based primarily on sediment cores extracted from the lake and analyzed by scientists at the St. Croix Watershed Research Station (SCWRS). Table below shows results from the load and concentration history reconstructions for the pre-1850 period, the 1940s, and the

1990s. The historical results revealed major shifts in Lake St. Croix beginning around 1950: large jumps in phosphorus loading and lake total phosphorus concentration, and a switch from benthic (bottom dwelling) to planktic (free floating) diatom community dominance. The St. Croix Basin Team recommended the 1940s-era conditions as load and water quality goals for Lake St. Croix. In terms of phosphorus, the 1940s-era conditions were 40 µg/L for TP concentration and 360 metric tons/yr. for overall P load.

Table 16. Historic P loading estimates in St. Croix Lake (Taken from Lake St. Croix TMDL Plan)

Time	Phosphorus Load (metric tons/yr)	Total Phosphorus (µg/L)	Chlorophyll-a2 (µg/L)	Secchi Depth2 (m)
Est. 2020	540	56	15	1.4
1990s	460	50	14	1.4
1940s	**360**	**40**	**12**	**1.5**
pre-1850	170	30	9	1.7

Graph 1. Lake St. Croix TMDL Phosphorous Allocations historic and TMDL



TMDL: WLA + LA + MOS + RC

WLA – The waste load allocation (WLA) is the total allowable pollutant load from all point sources (e.g. municipal, industrial, CAFOs, MS4 stormwater). Reserve capacity may either be built into the WLA or be a separate component of the total loading capacity to allow for future growth in the watershed.

LA – The load allocation (LA) is the allowable pollutant load from nonpoint sources (agricultural, CAFO off-site land-spreading, residential runoff, etc.). Natural sources (e.g., runoff from non-disturbed areas) are typically covered under the load allocation, and whenever possible nonpoint source loads and natural background loads should be distinguished.

MOS - The margin of safety (MOS) accounts for uncertainty in modeling and calculating WLAs and LAs.

RC - reserve capacity, which is a place-holder load for future pollutant sources or future expansion of existing sources.

The Total Maximum Daily Load, or "TMDL" report calls for a 38% reduction in the human-caused phosphorus carried to the rivers and streams of the basin, and eventually entering the St. Croix River and Lake St. Croix.

Washburn County allocations - Lake St. Croix TMDL

Washburn County's required reduction ranks 8th largest among the 19 counties in the basin.

To achieve the St. Croix Basin Partners' goal of 20% reduction by 2020

- 62,000 Lbs. of Phosphorous is the Current load (1990 baseline) from Washburn County
  - 51,300 Lbs of Phosphorous TMDL Load allocation for Washburn County
- = 10,660 Lbs of Phosphorous reduction to meet TMDL goals.
- To attain this goal, activities must be implemented that achieve an average annual rate of phosphorus reduction of:
  - *260 pounds per year over 30 years,*
  - *Or, 790 pounds per year over 10 years*

Table 17. Lake St. Croix TMDL Phosphorous Load Reductions by DNR Watersheds

Washburn County contributing area and baseline phosphorus loading by subwatershed.								
Area in St. Croix Basin (ac)		By land use (1992 NLCD) *						
County		Ag	Forest	Grassland	Shrub land	Urban	Water	Total
Washburn		43,347	318,316	40,093	2,502	2,565	27,787	434,610
Sub watersheds		10%	73%	9%	1%	1%	6%	100%
Clam		5,177	8,917	4,809	5	5	343	19,256
Namekagon		18,469	196,077	14,878	2,348	659	16,041	248,472
St Croix		0	742	13	10	0	0	765
Totagatic		2,099	60,168	2,571	87	274	4,813	70,012
Yellow		17,602	52,411	17,821	51	1,626	6,589	96,100
Baseline Loading (lb/yr) ***		By Land use (1992 NLCD)						TMDL Load Reduction**
County	Total	Ag	Forest	Grassland	Shrub land	Urban	Water	
Washburn	61,979	24,303	27,951	7,895	220	1,438	173	10,660
Subwatershed	100%	39%	45%	13%	0%	2%	0%	17%
Clam	4,638	2,902	783	947	0.5	3	2	1,203
Namekagon	31,178	10,355	17,217	2,930	206	370	100	4,503
St Croix	69	0	65	3	1	0	0	3
Totagatic	7,158	1,177	5,283	506	8	154	30	462
Yellow	18,937	9,869	4,602	3,509	4	912	41	4,488

NOTES:
* Land use areas derived from GIS based 1992 NLCD dataset
** TMDL load reduction= sum of land use area * difference between baseline and TMDL phosphorus export coefficient.

Wisconsin's non-point source pollution (NPS) program

There are three main stakeholders that manage NPS pollution in Wisconsin:

1. The WDNR
2. The Wisconsin Department of Agriculture, Trade and Consumer Protection (WDATCP),
3. *Wisconsin counties*.

The WDNR and WDATCP play three key roles in an effort to achieve the NPS management objectives and goals:

1) Creating and revising administrative rules;

2) Developing implementation tools and strategies;

3) Award funding through competitive and base grants

ADDITIONAL NPS PROGRAM STAKEHOLDERS INCLUDE:

State

- Wisconsin Department of Transportation - Culvert replacement and erosion control and stormwater management on transportation projects
- Wisconsin Department of Administration Coastal Management Program
- Regional Planning Commissions - Regional stormwater and floodplain management planning
- University of Wisconsin Extension (UWEX) - Statewide implementation, outreach and education
- University of Wisconsin System - Madison, Stevens Point, others - Research and technical assistance
- Wisconsin Land and Water Conservation Association (WI Land+Water) - Nonprofit organization representing Wisconsin's County Board Land Conservation Committees and Land Conservation Department employees
- Wisconsin Counties Association (WCA) - Governmental association representing the interests of counties at both the state and federal level
- League of Wisconsin Municipalities – Governmental association representing the interests of cities and villages
- Wisconsin Land and Water Conservation Board (LWCB) - Advises WDATCP and WDNR on NPS grant allocations; reviews management plans and administrative rules
- Wisconsin Geological and Natural History Survey – Conducts studies, writes reports on the state of groundwater resources

Federal NPS program stakeholders:

- Environmental Protection Agency (EPA)
- USDA Natural Resources Conservation Service (NRCS)
- USDA Farm Service Agency (FSA)
- USDA Forest Service
- U.S. Geological Survey (USGS)
- National Oceanic and Atmospheric Administration (NOAA)
- U.S. Army Corps of Engineers
- Tribal governments

Active advocacy groups in Wisconsin include, but are not limited to:

- River Alliance of Wisconsin
- Nature Conservancy
- Sand County Foundation
- Wisconsin Lakes
- Wisconsin Wetlands Association
- Gathering Waters Conservancy
- Wisconsin Farm Bureau Federation

- Wisconsin Dairy Business Association
- Professional Dairy Producers of Wisconsin
- Wisconsin Farmers Union
- Clean Wisconsin
- Wisconsin League of Conservation Voters
- Midwest Environmental Advocates
- Wisconsin Rural Water Association

Local Stakeholders – Washburn County

Lakes organizations will play a role in implementing this plan. The lake organizations of Washburn County are listed below.

Table 18. County Lake Associations

Washburn County Lakes and Rivers Association & the Lake Associations of Washburn County:
Bass-Patterson Lake Association
Bean Lake Association
Bear Lake Association
Big Chetac Chain Lake Association
Big Ripley Lake Association
Casey-Loon Lake Association
Deep Lake Association
Devil's Lake Association at Hunt Hill
Gilmore Lake Property Owners
Gull Lake Property Owners Association
Horseshoe Lake Association
Island Lake Association
Kimball Lake Protection Association
Lake Club of Silver Lake
Lake Nancy Protective Association
Little Long Lake Association
Little Ripley Lake Association
Lower McKenzie Lake Association
Long Lake Preservation Association
McKenzie Lakes Association
Minong Flowage Association
Pokegama Lake Association
Potato Lake Association
Red Cedar Lakes Association
Shell Lake District
Slim Lake Association
Spooner Lakes District
Stone Lake Shore Owners
Trego Lake District
Twin Lakes Preservation Association

Volunteer citizen monitoring will be encouraged to assist in evaluating progress toward goals and to increase citizen involvement in land and water conservation programs.

Citizen Lake Monitoring Program

WDNR Area Coordinator Kris Larsen

Table 19. Citizen Lake Monitoring Network for Washburn County

Balsam Lake	2112800	Actv	Chemistry	Deep Hole	663045	Terry	Pajerski
Bass Lake	2451300	Actv	Chemistry	Deep Hole	663050	Jerry	Perkins
Bass Lake (Patterson)	2451900	Actv	Secchi	Deep Hole	663112	Don	Richards
Bean Lake	2718500	Actv	Chemistry	Near Center	663128	Robert	Reinert
Big Bass Lake	2453300	Actv	Secchi	Center	663167	Lisa	Lundberg
Deep Lake	1844000	Actv	Chemistry	Deep Hole	663105	Bruce	Keyzer
Dunn Lake	2709800	Actv	Secchi	Middle Basin	663132	Kris	Larsen
Dunn Lake	2709800	Actv	Secchi	Southern Basin	663133	Kris	Larsen
Gilmore Lake	2695800	Actv	Chemistry	Deep Hole	663116	Gerald	Huse
Goose Lake	2709300	Actv	Secchi	Center	10048090	Troy	Defrates
Gull Lake	2719400	Actv	Secchi	Deep Hole	663137	Leroy	Gesche
Horseshoe Lake	2470000	Actv	Chemistry	West Basin	10042010	Kris	Carlton
Horseshoe Lake	2470000	Actv	DO/Temp/Secchi	Deep Hole	10042003	Mike	Durand
Kekegama Lake	2106200	Actv	Secchi	Center	663007	Terri Lynn	Sabby
Lake Nancy	2691500	Actv	Chemistry	Site A-Big Lake	663156	Sam	Lewis
Lake Nancy	2691500	Actv	Chemistry	Site B-Deep Hole	633151	Sam	Lewis
Leesome Lake	2474800	Actv	Secchi	Deep Hole	10044615	Jim	Sciacca
Little Ripley	2477300	Actv	Chemistry	Deep Hole	663114	Charlotte	Shover
Little Sand Lake	2477700	Actv	Secchi	Deep Hole	663186	Jeremy	Browen
Long Lake	2106800	Actv	Chemistry	Site A-Deep Hole	663088	Everett	Grilley
Long Lake	2106800	Actv	Chemistry	Site E	663092	Everett	Grilley
Long Lake	2106800	Actv	DO/Temp/Secchi	Site F	663118	Everett	Grilley
Long Lake	2106800	Actv	DO/Temp/Secchi	Mud Lk Entry	663062	Everett	Grilley
Lower Kimball Lake	2691800	Actv	Chemistry	Deep Hole	663059	John	Meier
Lower McKenzie Lake	2706300	Actv	Chemistry	Deep Hole	663101	Jim	Calabrese
Mathews Lake	2710800	Actv	Chemistry	Deep Hole	663054	Dick	Howard
McLain	2481600	Actv	Secchi	Deep Hole	663166	Ed	Rhodes
Middle Kimball Lake	2691900	Actv	Chemistry	Deep Hole	663052	Karen	Ellingson
Middle Twin Lake	2482100	Actv	Secchi	At Deep Spot	663102	Darryl	Rongitsch
Minong Flowage	2692900	Actv	Chemistry	Deep Hole	663099	Ron	Brown
Minong Flowage	2692900	Actv	Secchi	Central Basin	163300	Ron	Brown
North Twin Lake	2485900	Actv	Chemistry	Deep Hole	663103	Dave	Thorsen
Pavlas Lake	2488100	Actv	Secchi	Deep Hole	663141	Joe	Maxfield
Potato Lake	2714500	Actv	Chemistry	Deep Hole	663055	Harley	Wells
Shell Lake	2496300	Actv	Secchi	Deep Hole	663010	Steve	Byrd
Slim Lake	2109300	Actv	Chemistry	Deep Hole	663053	Rick	Werenics
South Twin Lake	2494500	Actv	Chemistry	Deep Hole	663104	Gary	Bergh
Spider Lake 1	1882100	Actv	Secchi	Deep Hole	663143	Craig	Walkey
Spider Lake 2	1882200	Actv	Secchi	Deep Hole	663144	Craig	Walkey
Spider Lake 3	1882300	Actv	Secchi	Deep Hole	663145	Craig	Walkey
Spider Lake 4	1882400	Actv	Secchi	Deep Hole	663146	Craig	Walkey
Spider Lake 5	1882500	Actv	Secchi	North Basin	663147	Craig	Walkey
Spider Lake 5	1882500	Actv	Secchi	Center Basin	663148	Craig	Walkey
Spider Lake 5	1882500	Actv	Secchi	South Basin	663149	Craig	Walkey
Stone Lake	1884100	Actv	Chemistry	Deep Hole	663051	Allen	Rosenwald
Tozer Lake	2502000	Actv	Secchi	Deep Hole	10028988	Dave	Vold
Unnamed Lake	2536900	Actv	Secchi	Deep Hole	663127	Fred	Blake
Upper Kimball Lake	2692000	Actv	Chemistry	Deep Hole	663058	Karen	Ellingson

Wisconsin Lake Leaders Institute, Current Washburn County Graduates - Enhancing Wisconsin's lake resources through leadership, training, and civic engagement.

Linda Anderson	Earl Cook	John Meyer	Lisa Burns
Fred Blake	Cathie Erickson	Philip Sylla	
Ronald Brown	Sam Lewis	Craig Walkey	

Identification of Impaired Waters

Every two years states are required to submit Water Quality Assessment Reports under Sections 305(b) and 303(d) of the Clean Water Act describing the condition of waters in the state. Section 303(d) of the Clean Water Act (CWA) mandates States to develop lists of all impaired waterbodies and prioritize these waters for establishment of plans to restore degraded areas (Total Maximum Daily Load reports). In addition, section 305(b) requires States to report on the overall condition of aquatic resources.

•The extent to which a state is assessing its waters for nutrient-related parameters,

•The extent of nitrogen and phosphorus pollution in the state, and

•The extent to which the state is working towards restoring nutrient-impaired waters by developing TMDLs or alternative restoration plans. Section 303(d) of the Clean Water Act (CWA) requires states to determine on a biennial basis whether waterbodies are impaired (not meeting designated uses or water quality criteria). One of the underlying goals of the CWA is to restore all impaired waters so they meet applicable water quality standards.

Table 20. Impaired Waters of Washburn County, Pollutant & Impairment

NAME	COUNTY NAME	WATER TYPE	POLLUTANT	IMPAIRMENT	STATUS_CODE
Big McKenzie Lake	Burnett, Washburn	Lake	Unknown Pollutant	Excess Algal Growth	Delist
Trego Lake	Washburn	Lake	Unknown Pollutant	Excess Algal Growth	Proposed for List
Balsam Lake	Washburn	Lake	Total Phosphorus	Eutrophication, Impairment Unknown, Excess Algal Growth	303d Listed
Red Cedar Lake	Barron, Washburn	Lake	Total Phosphorus	Eutrophication, Water Quality Use Restrictions, Excess Algal Growth	303d Listed
Slim Lake	Washburn	Lake	Total Phosphorus	Impairment Unknown	303d Listed
Bear Lake	Barron, Washburn	Lake	Total Phosphorus	Eutrophication, Excess Algal Growth	303d Listed
Long Lake	Washburn	Lake	Total Phosphorus	Eutrophication, Water Quality Use Restrictions	303d Listed
Deep Lake	Washburn	Lake	Total Phosphorus	Impairment Unknown, Excess Algal Growth	303d Listed
Gilmore Lake	Washburn	Lake	Total Phosphorus	Impairment Unknown	303d Listed
Gilmore Lake	Washburn	Lake	Mercury	Contaminated Fish Tissue	303d Listed
Harmon Lake	Washburn	Lake	Mercury	Contaminated Fish Tissue	303d Listed
Spring Lake	Washburn	Lake	Mercury	Contaminated Fish Tissue	Water Delisted
Silver Lake	Washburn	Lake	Mercury	Contaminated Fish Tissue	303d Listed
Minong Flowage	Douglas, Washburn	Impoundment	Mercury	Contaminated Fish Tissue	Water Delisted
Slim Creek	Washburn	River	Total Phosphorus	Impairment Unknown	Proposed for List

Local Components

Wisconsin's 72 counties, specifically the County Land and Water Conservation Departments, are the main vehicles for implementing state land and water conservation programs and funds targeting NPS pollution. The current regulatory approach to NPS pollution reduction centers on statewide enforceable agricultural and non-agricultural performance standards and manure management prohibitions (Chapter NR 151, Wis. Adm. Code. - RUNOFF MANAGEMENT).

NR 151 - AGRICULTURAL PERFORMANCE STANDARDS AND PROHIBITIONS

ALL FARMERS MUST:

- Meet tolerable soil loss ("T") on cropped fields and pastures.
- Annually develop and follow a Nutrient Management Plan (NMP) designed to keep nutrients and sediment from entering lakes, streams, wetlands and groundwater.
    - Farmers may hire a certified crop advisor or prepare their own NMP if they have received proper training.
    - Use the phosphorous index (PI) standard to ensure that their NMP adequately controls phosphorous runoff over the accounting period.
        - Croplands, pastures, and winter grazing areas shall average a phosphorus index of 6 or less over the crop rotation and may not exceed a phosphorus index of 12 in any individual year within the crop rotation.
- Avoid tilling within 5 feet of the edge of the bank of surface waters. This setback may be extended up to 20 feet to ensure bank integrity and prevent soil deposition.

FARMERS WITH LIVESTOCK MUST:

- Prevent direct runoff from feedlots or stored manure from entering lakes, streams, wetlands and groundwater.
- Limit access or otherwise manage livestock along lakes, streams and wetlands to maintain vegetative cover and prevent erosion.
- Prevent significant discharges of process wastewater (milkhouse waste, feed leachate, etc.) into lakes, streams, wetlands, or groundwater.

FARMERS WHO HAVE, OR PLAN TO BUILD, MANURE STORAGE STRUCTURES MUST:

- Maintain structures to prevent overflow and maintain contents at or below the specified margin of safety.
- Repair or upgrade any failing or leaking structures to prevent negative impacts to public health, aquatic life and groundwater.
- Close idle structures according to accepted standards.
- Meet technical standards for newly constructed or significantly altered structures.

FARMERS WITH LAND IN A WATER QUALITY MANAGEMENT AREA *(300 feet from streams, 1,000 feet from a lake, or in areas susceptible to groundwater contamination)* **MUST:**

- Avoid stacking manure in unconfined piles.
- Divert clean water away from feedlots, manure storage areas, and barnyards located within this area.

NR. 151 Implementation and enforcement

Land Conservation Departments take the lead role in the implementation of ***NR. 151 standards and prohibitions***.

Implementation and enforcement procedures for Livestock facilities.

Compliance requirements for a livestock owner or operator based on whether a livestock facility is existing or new.

1. An owner or operator of an existing livestock facility, shall comply with a livestock performance standard or prohibition if all of the following have been met:
    a. A determination is made that cost sharing has been made available.
    b. The owner or operator of the livestock facility has been notified, *see notification conditions*
2. An owner or operator of a new livestock facility, shall comply with the livestock performance standards and prohibitions, regardless of whether cost sharing is available.

Notification conditions

1.) An owner or operator must be notified in writing of the determinations.
2.) The notice shall be sent certified mail, return receipt requested or personal delivery.
The following information shall be included in the notice:

a) A description of the livestock performance standard or prohibition being violated.
b) The livestock facility status determination (new or existing)
c) The determination as to which best management practices or other corrective measures are needed to comply with a livestock performance standard or prohibition and that they are eligible for cost sharing.
    - Cost Sharing - Landowner pays 30% of the cost and in cases where there is financial hardship 10%.

3. A landowner or operator of a new livestock facility, shall comply with the cropland performance standards, regardless of whether cost sharing is available.

If that fails and when there is documented discharge the Land and Water Conservation Department, works closely with the Department of Natural Resources (DNR) and depending on the severity of the discharge and impacts to waters of the state – see categories below – either a Notice of Discharge (NOD) or Notice of Intent (NOI) to issue a NOD would be issued by the department to the owner or operator of the animal feeding operation. When there is no discharge documented then the Washburn County Land and Water Conservation Department will issue a non-compliance letter that includes a compliance schedule.

- Category I – The unacceptable practice is identified as a point source discharge of pollutants to navigable waters typically through man–made devices (example: pipes, ditches, etc.). Includes pollutants that are discharged into navigable waters that originate outside of the operation and pass over, across or through the operation or otherwise comes into direct contact with the animals confined at the operation.

- Category II – The unacceptable practice results in a discharge of pollutants to waters of the state due to failure to comply with the livestock performance standards and prohibitions identified in Chapter NR 151, Wisconsin Administrative Code.

- Category III – The unacceptable practice causes a discharge of pollutants to waters of the state that is not identified in the previous two categories.

Note: Under WI Sate Statue, Ch. 92. Local governmental unit may enact regulations of livestock operations that are consistent with and do not exceed the performance standards, and prohibitions. At this time Washburn County has not enacted these regulations.

Implementation and enforcement procedures for manure storage.

On October 23, 2014 Washburn County amended their Animal Waste Ordinance to update and include the manure storage standards and prohibitions. Enforcement is conducted through the county. Further review of this ordinance can be obtained at - https://library.municode.com/wi/washburn_county/codes/code_of_ordinances)

Implementation and enforcement procedures for cropland performance standards.

Compliance requirements for landowners and operators are based on whether the cropland is existing or new.

1. If any cropland is meeting a cropland performance standard on or after the effective date of the standard, the cropland performance standard shall continue to be met. If a landowner or operator alters or changes the management of the cropland in a manner that results in noncompliance with the performance standard, the landowner or operator shall bring the cropland back into compliance, regardless of whether cost-sharing is made available.
2. A landowner or operator of an existing cropland, shall comply with a cropland performance standard if all of the following have been done:
    a. a determination is made that cost sharing has been made available
    b. the landowner or operator has been notified

Notification conditions

    a. An owner or operator must be notified in writing of the determinations.
    b. The notice shall be sent certified mail, return receipt requested or personal delivery.
    c. The following information shall be included in the notice:
        i. A description of the cropland performance standard or prohibition being violated.
        ii. A determination (new or existing)
        iii. A determination as to which best management practices or other corrective measures are needed to comply the cropland performance standards and that they are eligible for cost sharing.
3. A landowner or operator of a new cropland, shall comply with the cropland performance standards, regardless of whether cost sharing is available.

If that fails when there is documented discharge, the Land and Water Conservation Department, works closely with the Department of Natural Resources (DNR) and depending on the severity of the discharge and impacts to waters of the state – see categories above – either a Notice of Discharge (NOD) or Notice of Intent (NOI) to issue a NOD would be issued by the department to the owner or operator of the animal feeding operation. When there is no discharge documented then the Washburn County Land and Water Conservation Department will issue a non-compliance letter that includes a compliance schedule.

Steady progress has been made towards carrying out the implementation strategy put in place shortly after Ch. NR 151, Wis. Adm. Code, went into effect October 1, 2002. However, the greatest barriers to implementation of performance standards continue to be insufficient staff levels, inadequate time and resources at both the state and county levels, and the lack of cost-share dollars for both hard (e.g. structural) and soft (e.g., management) practices.

NPS Pollution Inventory & Assessment

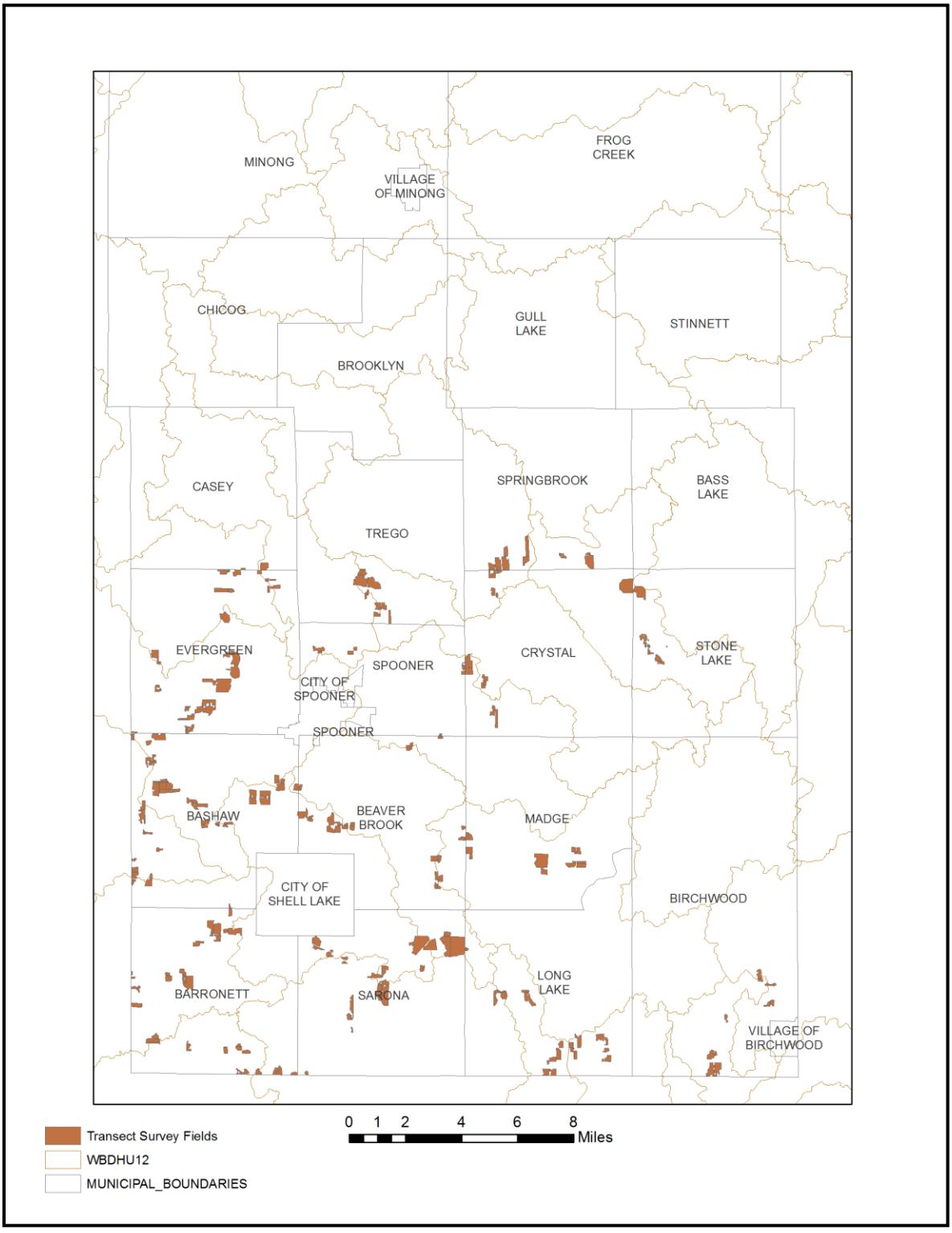
Cropland:

Washburn County has been conducting a transect survey since 2000. Originally it was done to show progress for meeting Wisconsin's goal of T by 2000 and covered the entire county. In the northern half of the county most of the crop production, as a result of the sandy soils and short growing season, consisted primarily of hay

production. In 2015 to the transect survey was modified to include more fields where crop production of corn and soybeans are more prevalent.

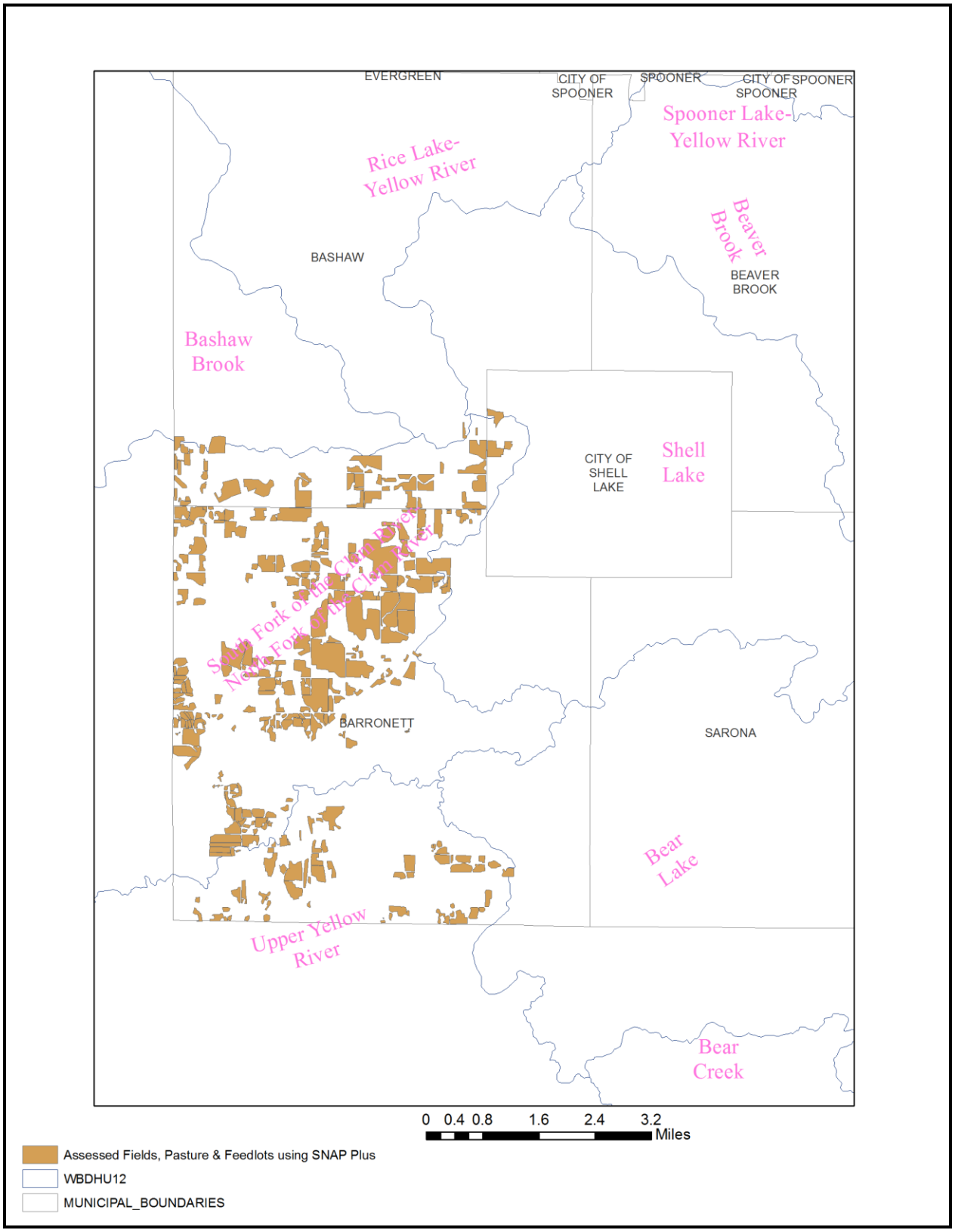
- Results of this survey shows an average soil loss of 2.1 tons per acre using SNAP plus
- Also used to survey gully erosion in fields, 4 have been identified and noted on inventory map.
- Done in the fall and spring to evaluate tillage and corn silage production.

Map 14. County Wide Transect Survey Fields & HUC 12 Watersheds



- South Fork of the North Fork of the Clam River HUC 12 watershed (19,596 Acres w/in Washburn Co.)
- Upper Yellow River HUC 12 watershed (5,981 Acres w/in Washburn Co.)

Map 15. Fields, Pastures & Feedlots



Inventory and assessment for the Upper Yellow River and the South Fork of the North Fork of the Clam River Watersheds

Objectives:

- *Estimate of phosphorous runoff from fields, pastures and feedlots*
- *Rank the fields, pastures and feedlots that are contributing the most phosphorous within their respective watersheds and use this to prioritize the allocation of resources and the coordination of effort with other agencies.*
- *Apply conservation practices and estimate Phosphorous reductions. Provide the structure for developing an implementation strategy (notices, information and education)*
- *Track reductions - Tracking itself will be done by putting this information onto a map, practices used, reduction amounts if and what NR 151 standards applied.*

Watersheds Assessment: Cropland using SNAP plus.

Explanation for the inputs used:

- The tillage information was based off from the transect survey on predominance of type and timing of tillage.
  - Used - SCD-SCND-SCND-SCND-SCND-SCND-SCND-None (Spring chisel & disc, Spring chisel no disc)

- crop rotation information was taken from UNITED STATES DEPARTMENT OF AGRICULTURE National Agricultural Statistics Service (USDA-NASS) Cropland Data Layer 2006 - 2016
  - Used - Cg-Sg15-Cg-Sg15-Cg-Csl-As-A (Corn grain, Soybean 15 inch row, Corn silage, Alfalfa seeding, Alfalfa) - *See table 2. page 13 for more detail*

- The soil test levels based on replacement needs of the crop for optimum level for the average yield within the County for the crop rotation. Additional information was taken from Nutrient Management Plans done within those watersheds.
  - Used - pH 6.6, Organic Matter 2.6%, P_2O_5 45 Lbs/Ac, K_2O 180 Lbs/Ac – *See table 15. Page 15 for more detail*

Table 21. Fields within the Upper Yellow River Watershed and their phosphorous losses

Rot. Avg PI - Rotational Average Phosphorous Index in Lbs/Acre/Year

Upper Yellow River					
Field Name	**Rot Avg PI**	**Field Name**	**Rot Avg PI**	**Field Name**	**Rot Avg PI**
37-13-31 1a	8	37-13-27 4b	3	37-13-34 2b	3
37-13-29 3a	7	37-13-28 3b	3	37-13-34 3a	3
37-13-32 3c	7	37-13-28 3c	3	37-13-35 1	3
37-13-27 4d	6	37-13-29 3f	3	37-13-35 3e	3
37-13-28 2	6	37-13-29 3g	3	37-13-35 3f	3
37-13-28 3d	6	37-13-29 4	3	37-13-35 3g	3
37-13-29 3	6	37-13-29 4d	3	37-13-35 i	3
37-13-31 4	6	37-13-29 4e	3	37-13-28 3a	2
37-13-32 1	6	37-13-29 4f	3	37-13-32 4b	2
37-13-32 3d	6	37-13-30 3	3	37-13-33 3	2
37-13-34 4	6	37-13-31 1	3	37-13-33 3c	2
37-13-35 2b	6	37-13-31 2	3	37-13-34 3	2
37-13-35 2c	6	37-13-31 3	3	37-13-34 3c	2
37-13-35 2d	6	37-13-31 4b	3	37-13-35 4	2
37-13-27 4c	5	37-13-32 3	3	37-13-32 3a	1
37-13-29 3 e	5	37-13-32 4	3	37-13-32 3b	1
37-13-35 2	5	37-13-32 4a	3	37-13-33 3a	1
37-13-35 2a	5	37-13-34 1	3	37-13-35 1a	1
37-13-27 4	3	37-13-34 2	3	37-13-35 3h	1
37-13-27 4a	3	37-13-34 2a	3		

Notes for the above table. Equation *((Phosphorus (**PI, lb. per acre per year)*** = [Particulate P losses from the edge of the field (PP, lb. per acre per year) + Dissolved P losses from the edge of the field, lb. per acre per year (SP)] x Total P Delivery Ratio (TPDR) *(Particulate is the P attached to the soil and organic matter, Dissolved is the P that is in solution))*

Table 22. Fields within the South Fork of the North Fork of the Clam River Watershed and their phosphorous losses

South Fork of the North Fork Clam River					
Field Name	**Rot Avg PI**	**Field Name**	**Rot Avg PI**	**Field Name**	**Rot Avg PI**
37-13-19 2g	10	37-13-19 1a	6	38-13-34 3c	6
37-13-20 2	9	37-13-19 1b	6	38-13-34 4b	6
37-13-20 2a	9	37-13-19 2	6	38-13-34 4c	6
37-13-20 2b	9	37-13-19 2b	6	38-13-34 4d	6
37-13-30 4	8	37-13-19 2c	6	37-13-10 2a	5
37-13-31 1c	8	37-13-19 2d	6	37-13-15 2	5
37-13-37 4b	8	37-13-19 2e	6	37-13-15 2d	5
37-13-30 4c	7	37-13-19 2f	6	37-13-15 3	5
37-13-31 4a	7	37-13-19 2i	6	37-13-16 1	5
37-13-10 1e	6	37-13-19 2j	6	37-13-16 1a	5
37-13-10 2	6	37-13-20 1h	6	37-13-16 1d	5
37-13-15 2b	6	37-13-20 1i	6	37-13-17 1a	5
37-13-15 2c	6	37-13-21 2	6	37-13-17 1d	5
37-13-16 2b	6	37-13-29 2c	6	37-13-17 3b	5
37-13-16 3	6	37-13-3	6	37-13-17 3c	5
37-13-16 3a	6	37-13-3 3e	6	37-13-17 4d	5
37-13-16 3b	6	37-13-4 3	6	37-13-18 2f	5
37-13-16 3c	6	37-13-4 4	6	37-13-19 3a	5
37-13-16 4	6	37-13-4 4b	6	37-13-21 2b	5
37-13-16 4a	6	37-13-6 2e	6	37-13-21 2c	5
37-13-16 4c	6	37-13-6 3	6	37-13-21 4	5
37-13-16 4d	6	37-13-7 2	6	37-13-29 1a	5
37-13-17 2	6	37-13-7b	6	37-13-29 1	5
37-13-17 2c	6	37-13-9 1	6	37-13-29 3b	5
37-13-17 2e	6	37-13-9 1b	6	37-13-29 3d	5
37-13-17 3a	6	37-13-9 2d	6	37-13-3 3	5
37-13-17 4	6	37-13-9 2e	6	37-13-3 3b	5
37-13-17 4a	6	37-13-9 3	6	37-13-3c	5
37-13-18 4	6	37-13-9 3a	6	37-13-5 3	5
37-13-19 1	6	38-13-26 3	6	37-13-5 3a	5

Table 22 Cont.

South Fork of the North Fork Clam River					
Field Name	**Rot Avg Pl**	**Field Name**	**Rot Avg Pl**	**Field Name**	**Rot Avg Pl**
37-13-5 4	5	37-13-18 3a	3	37-13-2a	3
37-13-6 1e	5	37-13-18 1	3	37-13-30 1	3
37-13-8 1c	5	37-13-18 1a	3	37-13-30 1a	3
37-13-8 1d	5	37-13-18 2	3	37-13-30 1c	3
37-13-9 2	5	37-13-18 2a	3	37-13-30 1d	3
37-13-9 2a	5	37-13-18 2b	3	37-13-30 1e	3
37-13-9 2b	5	37-13-18 2c	3	37-13-30 4a	3
37-13-9 2c	5	37-13-18 2d	3	37-13-3 2	3
38-13-33 4b	5	37-13-18 2e	3	37-13-3 3d	3
38-13-34 4a	5	37-13-18 2g	3	37-13-3 4b	3
38-13-35 3	5	37-13-18 3b	3	37-13-32 4c	3
38-13-8 1a	5	37-13-18 3c	3	37-13-4 3a	3
37-13-30 1b	4	37-13-19 2a	3	37-13-4 3c	3
37-13-10 1a	3	37-13-19 2h	3	37-13-4 4c	3
37-13-10 2b	3	37-13-19 3	3	37-13-5 1	3
37-13-10 2c	3	37-13-19 4	3	37-13-5 2	3
37-13-10 3	3	37-13-20 1a	3	37-13-5 2a	3
37-13-15 2a	3	37-13-20 1g	3	37-13-5 4a	3
37-13-15 2e	3	37-13-20 1j	3	37-13-6 1	3
37-13-15 2f	3	37-13-20 1k	3	37-13-6 1a	3
37-13-16 1b	3	37-13-20 2c	3	37-13-6 1b	3
37-13-16 1c	3	37-13-2 3d	3	37-13-6 1d	3
37-13-16 1e	3	37-13-2 3	3	37-13-6 2	3
37-13-17 1	3	37-13-2 3a	3	37-13-6 2f	3
37-13-17 2a	3	37-13-2 3b	3	37-13-6 3b	3
37-13-17 2d	3	37-13-21 1	3	37-13-6 3c	3
37-13-17 3	3	37-13-21 2a	3	37-13-7 2a	3
37-13-17 4b	3	37-13-21 3	3	37-13-7 2c	3
37-13-17 pit	3	37-13-21 3a	3	37-13-9 1a	3
37-13-18 3	3	37-13-29 2a	3	37-13-9 1c	3

Table 22 Cont.

South Fork of the North Fork Clam River					
Field Name	Rot Avg PI	**Field Name**	**Rot Avg PI**	**Field Name**	**Rot Avg PI**
37-13-9 1d	3	37-13-17 4c	2	38-13-33 1a	2
38-13-26 3a	3	37-13-20 1	2	38-13-33 1c	2
38-13-31 1	3	37-13-20 1d	2	38-13-33 4	2
38-13-31 2	3	37-13-20 1e	2	38-13-33 4f	2
38-13-31 2a	3	37-13-20 1f	2	38-13-34 3a	2
38-13-31 2c	3	37-13-2 3c	2	38-13-35 1a	2
38-13-31 2e	3	37-13-22 2	2	39-13-31 3d	2
38-13-31 2f	3	37-13-22 2a	2	37-13-17 1c	1
38-13-31 3a	3	37-13-22 2c	2	37-13-19 1c	1
38-13-31 3d	3	37-13-29 2	2	37-13-20 1c	1
38-13-31 3e	3	37-13-29 3c	2	37-13-32 4d	1
38-13-31 3f	3	37-13-29 4a	2	37-13-4 4a	1
38-13-32 4	3	37-13-29 4b	2	37-13-6 2c	1
38-13-33 4a	3	37-13-3 2a	2	37-13-6 2d	1
38-13-33 4c	3	37-13-3 4	2	37-13-6 3a	1
38-13-33 4e	3	37-13-3 4a	2	37-13-8 1b	1
38-13-34 3	3	37-13-4 3b	2	38-13-31 2b	1
38-13-34 4	3	37-13-4 3d	2	38-13-31 2d	1
38-13-35 1	3	37-13-4 3e	2	38-13-31 3	1
38-13-35 2	3	37-13-6 1c	2	38-13-31 3b	1
38-13-35 2a	3	37-13-8 2	2	38-13-31 4	1
38-13-35 3b	3	37-13-8 2a	2	38-13-34 1	1
37-13-10 1	2	37-18-8 1	2	38-13-5 4a	1
37-13-10 1c	2	38-13-32 3	2	37-13-6 2g	0
37-13-10 1d	2	38-13-33 1	2		

- ***South Fork of the North Fork of the Clam River – HUC 12 Watershed Assessment***
  - ***Cropland 3250 Acres & 255 fields***
  - ***Estimated Average PI = 4.4510 Lbs P/Ac./Yr. & Average Soil Loss 5.4 tons/acre/year***
  - ***Total annual P loss into surface water runoff = 14,471 Lbs***
- ***Upper Yellow River – HUC 12 Watershed Assessment***
  - ***Cropland 522 Acres & 61 fields***
  - ***Estimated Average PI = 4.0525 Lbs P/Ac. /Yr. & Average Soil Loss 5.0 tons/acre/year***
  - ***Total annual P loss into surface water runoff = 2,121 Lbs***

1. ***South Fork of the North Fork of the Clam River – HUC 12***
2. ***Upper Yellow River – HUC 12***

❖ *Cover crops of small grains following soybean*

Tillage: SCD-SCND-SCND-SCND-SCND-SCND-SCND-None
Rotation to: Cg-Sg+cv-Cg-Sg+cv-Cg-Csl-As-A (CV - small grain cover crop)

- South Fork of the North Fork of the Clam River – HUC 12 Watershed
  - Average PI = 3.8737 Lbs/Ac
  - Total annual P loss into surface water runoff with practice= 12,589 Lbs
  - Pounds Total P annual reduction with practice applied at 100% = 1,882
  - % reduction possible = 13
- Upper Yellow River – HUC 12 Watershed
  - Average PI = 3.627 Lbs/Ac
  - Total annual P loss into surface water runoff = 1,860 Lbs
  - Pounds Total P annual reduction with practice applied at 100% = 261
  - % reduction possible = 12

❖ *Converting fields with high Phosphorous loss (rotational average PI equal to or greater than 8) into Managed Pastures (Pasture, rotationally stocked, grass/legume, legume 30% or more)*

South Fork of the North Fork of the South Fork Clam River – HUC 12 Watershed

- Annual Phosphorous reduction with practice applied at 100% = 565 Lbs
- Average per year P reduction - 9 Lbs/Ac/Year

Table 23. High P Fields to rotationally stocked, grass legume forage with > 30% legume South Fork of the North Fork of the Clam River HUC 12 WS

Converting high Phosphorous loss cropland fields to managed pasture (South Fork of the North Fork of the Clam River)				
Field Name	**Cropland Rotational Avg P Loss (Lbs/AC)**	**Acres**	**Product**	**Pasture, rotational stocking, grass/legume**
37-13-19 2g	10	3.8	38.0	0
37-13-20 2	9	5.0	45.0	0
37-13-20 2a	9	5.0	45.0	0
37-13-20 2b	9	5.2	46.8	0
37-13-30 4	8	14.4	115.2	0
37-13-31 1c	8	3.9	31.2	0
37-13-37 4b	8	30.5	244.0	0

- Upper Yellow River – HUC 12 Watershed
    - Annual Phosphorous reduction with practice applied at 100% = 78.4 Lbs
    - Average P reduction attainable - 8 Lbs/Ac/Year

Table 24. Converting high P Fields to rotationally stocked, grass legume forage with > 30% legume Upper Yellow River HUC 12 WS

Converting high Phosphorous loss cropland fields to managed pasture (Upper Yellow River)				
Field Name	**Cropland Rotational Avg P Loss (Lbs/AC)**	**Acres**	**Product**	**Pasture, rotational stocking, grass/legume**
37-13-31 1a	8	9.8	78.4	0

Nutrient Reduction Strategy, Pasture:

Note: due to the relative small size of cropland area versus pasture and feedlot area the Upper Yellow River Watershed and the South Fork of the North Fork of the Clam River have been combined in assessing the phosphorous runoff estimates and the reduction estimates resulting from the installation of conservation practices.

❖ *Converting continuous stocked, high density pastures to pastures with rotational stocked, grass and legume forage with more than 30% legumes, Results in table below*

Table 25. Converting continuous stocked high density to rotationally stocked, grass legume forage with > 30% legume

Field Name	**Acres**	**Past. Continuous stocking P Lbs/AC/Yr.**	**TP (Acres X PI)**	**Past. Rotational Stocking P Lbs/Ac/Yr.**
37-13-14 past 4	19.6	2	39	1
37-13-15 2d pasture	3.7	4	15	1
37-13-15 pasture	10.7	2	21	1
37-13-19 pasture	2.6	4	10	1
37-13-30 pasture	23.3	5	117	1
37-13-31 3 pasture	9.8	2	20	1
37-13-32 past	6.0	1	6	1
37-13-32 past A	24.0	1	24	1
37-13-34 pasture	11.2	1	11	1
37-13-4 past	18.9	2	38	1
38-13-26 4 pasture	17.8	2	36	1

Upper Yellow River and North Fork of the South Fork of the Clam River

- 148 acres of pasture within the two watersheds
- High density non managed pasture P runoff 2.363 Lbs/Acre to a Managed (rotationally stocked) grass and legume forage with 30% or more legumes, P runoff of 1 Lbs/Acre.
- P reduction within the two watersheds with practice applied at 100%. (Assuming half of the pastures meet the criteria of being a high density non-managed pasture) = 94.45 pounds

Nutrient Reduction Strategy, Feedlots:

❖ *Converting feedlots into rotationally stocked, managed pastures*

Within Washburn County the number of dairy farms has gone down from 123 in 1987 to 20 in 2016. Often these farms switch over to raising beef to utilize their pasture. Traditionally, and is still often the case the cattle are being fed and watered in an area near the barn as they did when it was a dairy farm. Generally they are tied there because of the cattle watering system. In addition often a portion of the feedlot receives additional runoff water from the barn roof and other impervious surfaces near the barn. While there are remedies for diverting the extra roof runoff water, having an additional watering system or more and moving them away from the barn placed higher up in the landscape where there is little runoff water will result in greater phosphorous reductions. In addition there is an economic benefit with rotational stocking in producing higher forage yields

Table 26. Converting Feedlots into rotationally stocked, managed pastures

Name	Acres	Feedlot P (Lbs/Ac/Yr.)	TP (Lbs/Ac/Yr.)	As managed Past P (Lbs/Ac/Yr.)
37-13-31 feedlot	0.9	29	26	1
37-13-9 1 feedlot	1.7	22	37	1
37-13-9 2 feedlot	0.8	22	18	1
37-13-9 2a feedlot	0.8	22	18	1
37-13-15 2afeedlot	0.4	20	8	1
37-13-15 2feedlot	0.6	11	7	1
37-13-19 3feedlot	0.6	11	7	0
37-13-9 1a feedlot	0.5	11	6	1
37-13-34 feedlot	0.1	10	1	1
37-13-3 feedlot	0.1	9	1	1
37-13-19 feedlot	1.0	7	7	1
38-13-31 3 feedlot	0.8	5	4	1

- Phosphorous coming from feedlots from both watersheds (138 Lbs/Acre/Year)
- Converted to Rotational stocked, managed pastures (8 Lbs/Acre/Year)
- 103 Lbs per acre per year reductions when 100% applied

Note: Phosphorous contributions are based on there being bare soils high in Phosphorous. It does no account for the runoff going through these areas and having manure on the surface, neither is it considering the amount of runoff from the impervious surfaces near the feedlots. Of the estimates this one likely deviates from the actual contributions and therefore also the reductions. Here both are likely to be significantly underestimated. High ranking sites will be prioritized and respective resources applied accordingly. Once practices are applied further assessment for Phosphorous reductions will be done using BARNY.

Note: There are zero Feedlots within the Surface Water Quality Management areas (Surface Water Quality Management Area, 1000 feet from a pond or lake, and 300 feet from a stream or river) within these two watersheds.

Priority Farms are:

1. Remaining Dairy farms - with just 20 left and one being a CAFO, the rest will be chosen as priority farms to encourage them to have updated NM plans.
2. Farms determined to have high phosphorous losses within the assessed watersheds.
3. Farms subject to a DNR notice of intent
4. Unused manure storage structures. Due to the dwindling number of dairy farms within Washburn County it is likely there are a number unused manure storage structures. Considering the risk they pose to groundwater and to the safety of people and animals, their proper abandonment will be a priority.

Goals & Voluntary Implementation Strategy with Targets

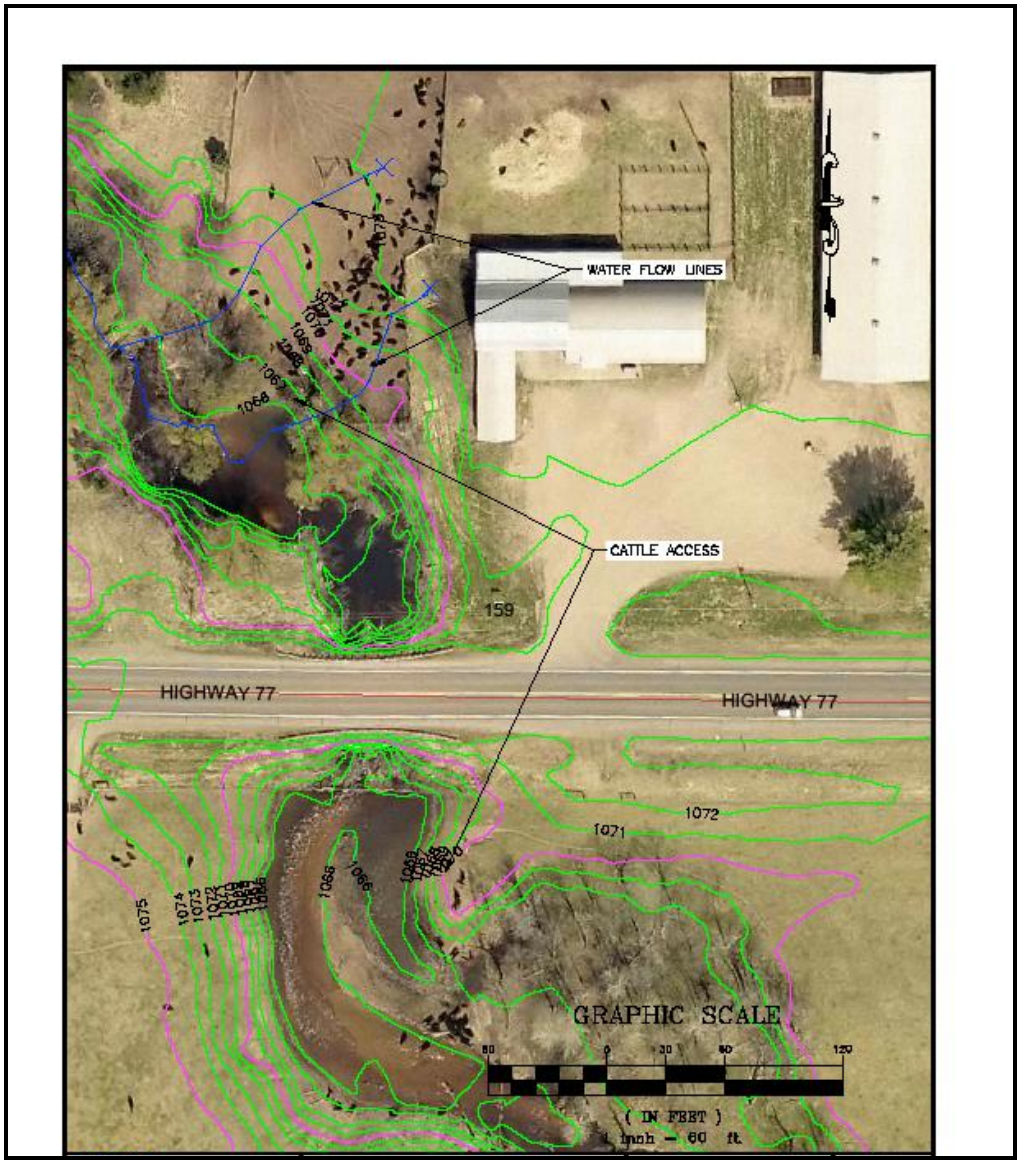
GOAL 1:

Pollutant load reductions within the South Fork of the North Fork of the Clam River and the Upper Yellow River HUC 12 Watersheds.

- Target: Reduce phosphorous loss from cropland by planting 5% of the cropland to a small grain cover crop following soybeans
    - South Fork of the North Fork of the Clam River – *162 acres (94 Lbs P per year)*
    - Upper Yellow River – 26 acres *(13 Lbs P per year)*
- Target: Reduce phosphorous from cropland by converting 10% of the high phosphorous runoff fields (rotational average of 8 lbs per acre per year) to managed rotationally stocked pastures.
    - South Fork of the North Fork of the Clam River – *6 acres (57 Lbs P per year)*
    - Upper Yellow River – *1 acre (8 Lbs P per year)*
- Target: Convert 10% of the continuously stocked, high density pastures to pastures with rotational stocked, grass and legume forage with more than 30% legumes pastures
    - South Fork of the North Fork of the Clam River and Upper Yellow River - *7 acres (9 Lbs P per year)*
- Target: Reduce phosphorous from feedlots by converting 10% of their acreage to managed rotationally stocked pastures.
    - South Fork of the North Fork of the Clam River and Upper Yellow River – *0.8 acres* (*14 Lbs P per year)*

- Target - within the next five years complete the inventory and assessment for the remaining HUC 12 watersheds within the County.
    - Setting water quality goals, in consultation with the WDNR for them.
    - Provide the structure for developing an implementation strategy (notice, information and education, etc.) for each watershed

Map 16. Site assessed for NR 151 compliance using DEM model and aerial photo (feedlot and stream bank vegetation)



GOAL 3.

Conduct additional Inventories throughout Washburn County including assessment for compliance with NR 151.

Note: often these will be done by using high resolution aerial photographs along with digital elevation models, e.g. map 11.

- Target in the next five years inventory of the following
    - Unused manure storage facilities
    - Used manure storage facilities
    - Cattle access to surface water where the access levels prevents the establishment of vegetated cover
    - Feedlots draining directly to surface waters
    - Tillage near surface waters
    - Identify strategies to promote voluntary compliance with statewide performance standards and prohibitions, including information, cost-sharing, and technical assistance.

GOAL 4.

Lake and Stream Protection

- Terrestrial Invasive Species education, prevention and control
    - Assist 5 landowners with control options for terrestrial invasive species on their property (.5 acre) per year
    - Monitor and control 10 stands of Japanese knotweed per year
    - Educate 100 people about terrestrial invasive species per year
- Aquatic Invasive Species education, prevention and control
    - Monitor 3 lakes using the DNR Early Detection Protocol per year
    - Conduct 200 hours of Clean Boats Clean Waters Inspections at boat landings per year
    - Conduct 2 AIS Citizen Lake Monitoring workshops per year
    - Conduct 2 Clean Boats Clean Waters workshops per year
    - Release 10,000 purple loosestrife bio-control beetles per year
- Native Shoreline Restoration and Installation
    - Target: 50 feet of shoreline buffer a year, 250 feet (0.2 Acres) in the next 5 years
- Stream and lake shore protection
    - Target: 50 feet of stream and lakeshore protection per year, 250 in the next 5 years

GOAL 5.

Groundwater Protection

- Proper abandonment of unused manure storage structures
    - Target 0.5 per year, 2.5 in the next 5 years
    - Proper abandonment of unused drinking wells
    - Target: 1 per year, 5 in the next 5 years

GOAL 6.

Nutrient Management planning and training

- Target: Of the remaining 20 dairy farmers increase by 30% those that have a Nutrient Management Plan within the next five years.

GOAL 7.

Assist municipalities in protecting and enhancing recreational areas, to and near lakes and rivers.

- Improve access roads to lake and rivers by diverting runoff water from flowing over them.
    - Target 0.5 per year, 2.5 in the next 5 years
- Inventory of boat landings and other public areas to the lakes and rivers within Washburn County. For some lakes and rivers these are the areas having the highest levels of sediment contribution into them.
    - Target all by 2019 (48 listed by DNR)
- Assist with design and grants as needed for providing access, improving existing accesses and improve accesses to meet ADA requirements
    - Target 0.5 improvements per year, 2 in the next 5 years
- Install infiltration basins to capture and infiltrate storm water runoff
    - Target 0.5 basins per year, 2.5 in the next 5 years
- Inventory of urban areas causing untreated storm water runoff going into surface waters

GOAL 8.

Assistance with Permits and Ordinances

- Animal Waste Ordinance
    - Issue permits, 0.5 per year
    - Review construction plans and construction of manure storage structures, new and significantly altered, 0.5 per year
    - Review Nutrient Management Plans, 5 per year
- Shoreline Ordinance
    - Review and create shoreline buffer plans, 4 per year
    - Monitor compliance and assist with enforcement, 2 per year

- Nonmetallic mining
    - Review reclamation plans, 3 per year
    - Assist in developing reclamation plans, 1 per year
    - Monitor for compliance and assist with enforcement, 4 per year

Local Coordination

The goals of the Washburn County Land and Water Resource Management Program will be accomplished through coordination with local, state, and federal agencies and private organizations using existing regulations funding sources and a voluntary implementation strategy.

Regulations for Plan Implementation

WASHBURN COUNTY CODE, Chapter 10 – ANIMALS, ARTICLE II. - ANIMAL WASTES

- Purpose of this article is to regulate the location, design, construction, installation, alteration, operation, and maintenance of all new livestock manure storage facilities. This article also regulates the closure of livestock manure storage facilities and assures the safe handling and spreading of manure in order to prevent water pollution. It is further intended to provide for the administration and enforcement of this article and to provide penalties for its violation.
- Revised in 2014 to incorporate NR 151 Standards as related to storage and utilization of animal waste.

WASHBURN COUNTY CODE, Chapter 28 – ENVIRONMENT, ARTICLE II. - NONMETALLIC MINING RECLAMATION

- Established a local program to ensure the effective reclamation of nonmetallic mining sites on which nonmetallic mining takes place in Washburn County
- Review plans as a condition of the permit which includes ensuring that the necessary measures for erosion control and safeguarding of the groundwater are planned and implemented.

Chapter 38 - LAND DEVELOPMENT CODE, ARTICLE IV. - ZONING REGULATIONS, DIVISION 27. - SHORELAND PROTECTION

1) Further the maintenance of safe and healthful conditions and prevent and control water pollution through:

a. Limiting structures to those areas where soil and geological conditions will provide a safe foundation.

b. Establishing minimum lot sizes to provide adequate area for private on-site waste treatment systems.

c. Controlling filling and grading to prevent soil erosion problems.

d. Limiting impervious surfaces to control runoff which carries pollutants.

(2) Protect spawning grounds, fish and aquatic life through:

a. Preserving wetlands and other fish and aquatic habitat.

b. Regulating pollution sources.

c. Controlling shoreline alterations, dredging and lagooning.

(3)*Control building sites, placement of structures and land uses through:*

a. Prohibiting certain uses detrimental to the shoreland-wetlands.

b. Setting minimum lot sizes and widths.

c. Setting minimum building setbacks from waterways.

d. Setting the maximum height of near shore structures.

(4) Preserve and restore shoreland vegetation and natural scenic beauty through:

a. Restricting the removal of natural shoreland cover.

b. Preventing shoreline encroachment by structures.

c. Controlling shoreland excavation and other earth moving activities.

d. Regulating the use and placement of boathouses and other structures.

Local Ordinance development:

County and local governments may regulate conservation practices on farms, within limits specified by state law.

- Including local regulation of:
  - NR 151, Wis. Adm. Code, performance standards and prohibitions
  - manure storage (Washburn County Animal Waste Ordinance)
  - shoreland management (Washburn County Shoreland Zoning)
  - livestock facility siting ordinances

State's NR 151 RUNOFF MANAGEMENT

Agriculture Performance Standards and Prohibitions

The Wisconsin Department of Natural Resources (DNR) relies heavily on county Land Conservation Departments to fully implement the livestock performance standards and prohibitions. ***See page 38 for more details***

Non-Agricultural Performance Standards (not a complete list)

Enforced by WDNR except for transportation facilities which are enforced by the Department of Transportation.

- ***New Development Construction sites***
  - Construction sites with one or more acre of land disturbance, standard is a maximum discharge of 5 tons per acre per year of sediment.
- ***Post-construction storm water management Plan***
  - *Total suspended solids*
    - new development, by design, reduce to the maximum extent practicable, the total suspended solids load by 80% compared to no controlsFor redevelopment, and infill by design, reduce to the maximum extent practicable, the total suspended solids load by 40% compared to no controls
  - *Peak discharge*
    - BMPs shall be employed to maintain or reduce the 1-year, 24-hour and the 2-year, 24-hour post-construction peak runoff discharge rates to the 1-year, 24-hour and the 2-year, 24-hour pre-development peak runoff discharge rates respectively
  - *Infiltration*
    - Low imperviousness, such as low density residential developments, parks

        - post-development infiltration volume shall be at least 90% of the pre-development infiltration volume
    - Moderate imperviousness, such as commercial, industrial and institutional development, or medium to high residential development
        - post development infiltration volume shall be at least 75% of the pre-development infiltration volume

    - High imperviousness, such as strip malls, shopping centers, and downtown areas
        - Post development volume shall be at least 60% of the pre-development infiltration volume

- **Protective areas performance standard.**
  Impervious surfaces shall be kept out of these protective areas entirely or to the maximum extent practicable:
    - Outstanding resource waters and exceptional resource waters, 75 feet
    - Lakes and Perennial and intermittent streams, 50 feet.
    - Highly quality wetlands, 75 feet
    - For lower quality wetlands (dominated by invasive species such as reed canary grass, are cultivated hydric soils; and any gravel pits, or dredged material or fill material disposal sites that take on the attributes of a wetland) ten percent of the average wetland width
    - For concentrated flow channels with drainage areas greater than 130 acres, 10 feet.

  Where land disturbing construction activity occurs within a protective area, adequate sod or self-sustaining vegetative cover of 70 percent or greater shall be established and maintained where no impervious surface is present.

Financial Resources for Plan Implementation

State:

Targeted Runoff Management (TRM) Grants: these grants assist landowners in implementing BMPs used to help bring existing operations come into compliance with NR 151 performance standards. Counties are eligible to apply, and up to 70% of the costs of the BMPs may be eligible for reimbursement. Large scale TRM grants also have some funding for cropland practices.

Notice of Discharge (NOD) Grants: if the DNR determines that a farm has a discharge and issues either a Notice of Discharge or a Notice of Intent to issue an NOD, the farm may be eligible for NOD grants. NOD grants reimburse up to 70% of the costs of BMP's associated with bringing the farm into compliance.

Lake Protection and Classification Grants: assist in conducting activities that will protect or improve the quality of water in lakes, the natural ecosystem of lakes or the uses of lakes.

Lake Management Planning Grants: assist lake planning projects by helping to provide information and education on the uses of lakes, the quality of water in lakes, the quality of fish, aquatic life and their habitat in lakes, and the general quality of lake ecosystems. They will be used to improve lake management assessment by increasing local understanding of the causes of lake problems and by aiding in the selection of activities to prevent degradation of lakes and protect or improve the quality of lakes and their ecosystems.

River Protection Grants: assist local organizations in protecting rivers by helping to provide information on riverine ecosystems, by improving river system assessment and planning, by increasing local understanding of the causes of river problems and by assisting in implementing management activities that protect or restore river ecosystems.

Working Lands Initiative is comprised of three programs:

- Farmland Preservation Program per acre fee paid $5, meet NR 151 standards
- Agricultural Enterprise Area Program per acre fee paid $7 both FPP and AEA $10, meet NR 151 standards
- Purchase of Agricultural Conservation Easement Program (which currently is not funded).

Wisconsin's Clean Sweep - Provides financial assistance to Wisconsin counties, regional planning commissions, cities, villages, and other municipalities to collect and dispose of unwanted pesticides, household hazardous wastes, and prescription drugs, reducing public health and water quality risks

State & County SWRMP (Soil & Water Resource Management Program) *Each of Wisconsin's 72 counties has a Land Conservation Committee (LCC) which oversees the activities of a Land and Water Conservation Department (LWCD) They provide educational outreach and technical assistance to the public on land and water resource management issues including lake and stream conservation, erosion control, groundwater protection, farmland preservation, water quality, and capacity-building of stakeholders involved with conserving natural resources.*

Every 10 years, counties must revise their LWRM plans and are scheduled to present these revisions to the Land and Water Conservation Board (LWCB).Inventorying water quality and soil erosion conditions in the county.

- *Identifying relevant state and local regulations, and any inconsistencies between them.*
- *Setting water quality goals, in consultation with the WDNR.*
- *Identifying key water quality and soil erosion problems, and practices to address those problems.*
- *Identifying priority farm areas using a range of criteria (e.g. impaired waters, manure management, high nutrient applications).*
- *Identifying strategies to promote voluntary compliance with statewide performance standards and prohibitions, including information, cost-sharing, and technical assistance.*

- *Identifying enforcement procedures, including notice and appeal procedures.*
- *Including a multi-year workplan to achieve soil and water conservation objectives*

Washburn County Soil and Water Resource Management (SWRM) ***Grant - 2017 allocation***

- Total Staffing Grant $102,756.00
- Conservation Practice Installation Cost Share $48,800
- Nutrient Management Planning $5,600

Federal:

- Environmental Quality Incentives Program (EQIP). A voluntary program that provides financial and technical assistance to agricultural producers to plan and implement conservation practices that improve soil, water, plant, animal, air and related natural resources on agricultural land and non-industrial private forestland.
- Conservation Stewardship Programs helps you build on the existing conservation efforts
- Conservation Reserve Program (CRP). The Conservation Reserve Program (CRP) is a land conservation program administered by the Farm Service Agency (FSA). In exchange for a yearly rental payment, farmers enrolled in the program agree to remove environmentally sensitive land from agricultural production and plant species that will improve environmental health and quality.
- Wetlands Reserve Program (WRP). A voluntary program offering landowners the opportunity to protect, restore, and enhance wetlands on their property. Provides cost-sharing to restore wetlands previously altered for agricultural use.

VOLUNTARY IMPLEMENTATION STRATEGY:

Goal 1. Pollutant load reductions within the South Fork of the North Fork of the Clam River and the Upper Yellow River HUC 12 Watersheds

Upper Yellow River and South Fork of the North Fork Clam River. An assessment was completed using SNAP plus for all of the fields, pastures and feedlots. Tables were created to show the estimated phosphorous losses from each land use area and ranked.

- All feedlots within these watersheds will be viewed for further assessment and reviewed for compliance. The assessment will include determinations for conservation practices that could be utilized. Farmers will also be contacted to discuss these practices and their interest in them. Conservation Practices would include: watering facilities, fencing, animal trail and walkway, clean water diversion, heavy use area protection, vegetative treatment strips, roof runoff, and milk house waste treatment.

- For pastures, pasture conditions will be field verified to determine pasture conditions. Owners with pastures that are poorly managed will be contacted to determine interest in rotational grazing if cost share assistance can cover a majority of the cost. Conservation Practices would include: watering facilities, fencing, animal trail and walkway and clean water diversions.

- Fields with high phosphorous loss.
    - Determine if converting to pasture is an option for them.
    - Work with NRCS to determine if payments are available for these landowners.
    - Work with UW Extension and NRCS in providing soil health workshops and confirm they'll be notified when they do occur.
- Contact owners of manure pits that are no longer being used and notify them of cost share assistance availability, there risk to groundwater, safety concerns and the financial benefits of turning them into productive fields or pastures.

Goal 2 & 3. Inventory and assessment of the remaining HUC 12 Watersheds: fields, pastures and feedlots

- Complete Inventory and assessment using SNAP plus for all of the fields, pastures and feedlots. Create tables to show the estimated phosphorous losses from each land use area and rank them.
- Contact owners of manure pits that are no longer being used and notify them of cost share assistance availability, there risk to groundwater, safety concerns and the financial benefits of turning them into productive fields or pastures.
- Contact owners where cattle access prevents the establishment of vegetation, notify them of the rules and seek alternatives, such as cattle watering facilities, stream crossings and fencing.
- Feedlots draining directly to surface waters. Contact owners, notify them of the rules and seek alternatives, such as cattle watering facilities, stream crossings and fencing, water diversions.
- Tillage near surface waters and not meeting rules. Notify to let them know the rules.

Goal 4. Lake and Stream Protection

- Aquatic Invasive Species
    - Submit educational articles to local newspapers and lake association newsletters.
    - Attend and present at lake association meetings, conferences, workshops, school events.
    - Work with Burnett County LWCD, WI DNR and McKenzie Lakes association to implement best management options for zebra mussel control.
    - Assist lake associations with lake monitoring efforts, including purple loosestrife biocontrol.
    - Implement the county-wide AIS Strategic plan.
    - Apply for DNR grant funding.
    - Inventory and map locations of AIS.

- Promote environmental youth speaker and poster contest.

- Terrestrial Invasive Species
  - Promote the Saint Croix Red Cedar Cooperative Weed Management Area (SCRC CWMA).
  - Promote and utilize the CWMA tool trailer for educational purposes and to help landowners control invasive species on their property
  - Write newsletter articles discussing invasive species and control options
  - Attend and present at conferences, workshops, school events.
  - Meet with landowners upon request to discuss management and control options on their property.
  - Inventory and map locations of terrestrial invasive species.

- Shoreline Restoration
  - Submit educational articles to local newspapers and lake association newsletters regarding the benefits of native plantings and what landowners can do.
  - Assist landowners with native planting plan on their property and availability.
  - Encourage landowners to participate in annual department tree, shrub and wildflower sale.
  - Promote the DNR Healthy Lakes program.

- Stream and Lakeshore Protection
  - Assist landowners with proper shoreline protection practices. Outreach has not been needed.

Goal 5. Groundwater Protection

- Contact well drillers to let them know we cost share on well abandonments
- Write newspaper articles on well abandonments
- Contact those farmers and landowners who have manure storage structures no longer in service. Discuss benefits of proper abandonment for protecting groundwater and for the safety of people and livestock, technical and financial assistance available and the benefits of turning area into usable land.

Goal 6. Nutrient Management *planning and training*

- Apply for Nutrient Management Education Grant, contact dairy farmers to let them know of available funds and assistance for developing plans.
- Write Newspaper articles highlighting the benefits of doing Nutrient Management plans.

Goal 7. Assist municipalities in protecting and enhancing recreational areas, to and near lakes and rivers.

- Notify local officials of assistance, financial and technical

Goal 8. Assistance with Permits and Ordinances

- Not applicable

EVALUATION OF LWRMP

Evaluation of LWRMP in obtaining phosphorous reductions:

- Estimates for reductions in phosphorous using SNAP plus for each watershed and practice installed.
- Determine success or failure in meeting phosphorous reduction goals.
- Inventory of NR 151 violations. Develop a financing strategy.
- For reduction in sediment and phosphorous for gully erosion, critical area treatment shoreline protection and infiltration basins using STEPL determine effectiveness of each practice and alternative practices for obtaining similar reductions.

EVALUATION OF WATER QUALITY, STATUS.

- Citizen based monitoring
- DNR webpages
  - Monitoring Data –SWIMS
  - Assessment Data -- WATERS

TRACKING

Tracking using ArcGIS mapping, spreadsheets, & landowner files

- Acres with Nutrient Management Plans
- NR 151 compliance measures resolved
- Estimate in Phosphorous reductions with practices Implemented
- Number of manure pits and drinking wells properly abandoned.

REPORTING

- Assess the effectiveness of programs in meeting their goals, objectives, and performance measures in DATCP annual reports and five year LWRMP updates.
- Place results onto our Departments web page.

Public input and Plan development:

This being the third revision it was decided a more comprehensive approach in reaching out to a broader audience should be an objective and too also create a plan that wasn't a repeat of the previous two.

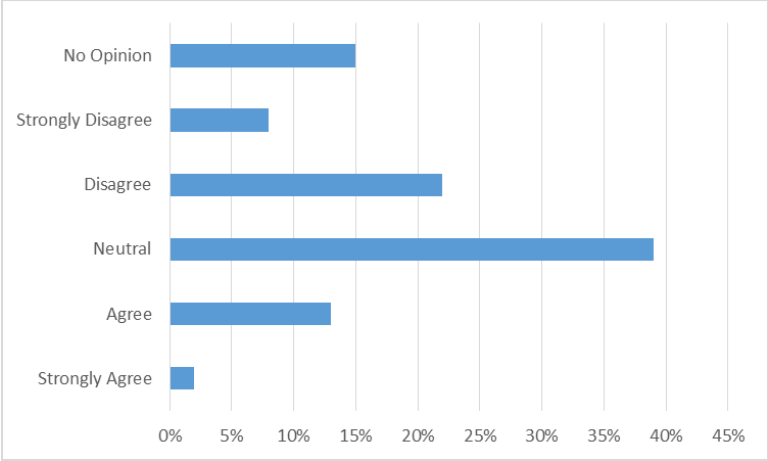
Step 1. Create and send out a comprehensive survey to a broader audience. In creating the survey previous comments gathered from past LWRMP meetings and the survey results from the county's comprehensive plan were researched. Looking to gather new and useful information

was a priority in creating the 43 question survey. This survey was sent to 445 residents of Washburn County of which 126 were returned. Below is a sample of those questions.

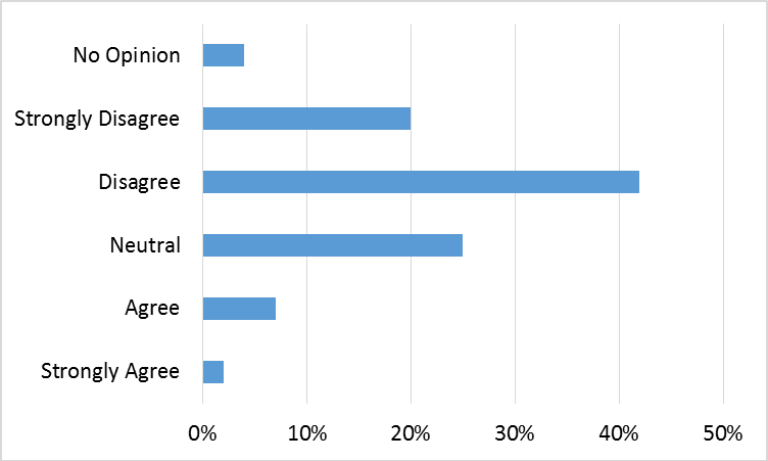
- How do you determine the amount and type of nutrients your crop needs to meet your production goals?
  - 42 responses, 62% from agronomist, 33% Nutrient Management Plan, 5% both

- Nutrient management planning is a way for Wisconsin farmers to ensure that their crops get the right source of nutrients at the right rate, time and place to match crop needs and minimize nutrient losses from fields. A nutrient management plan accounts for all activities on the farm and in individual fields that affect nutrient needs and losses. The Washburn County Land Conservation Department can apply for a grant for teaching farmers on how to write their own Nutrient Management Plan. This grant can assist by paying for soil tests and provide an incentive payment to participants. Would you be interested?
  - 43 responses, 53% yes, 14% would like more information, 33% no.

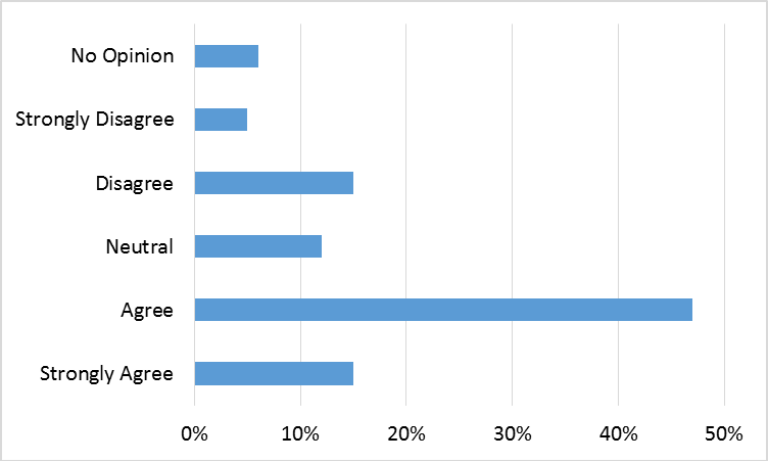
- Finding suitable land on which to spread manure is difficult?



- More restrictive agricultural regulations are needed to protect our surface waters?



❖ Fragmented land and smaller parcels are making farming more difficult in in Washburn County



Step 2. Utilizing the emerging technical advancements. This included looking at the various modeling programs discussed earlier. It also included the use of high resolution photographs, remote sensing data and Digital Elevation Models (DEM) derived from LiDAR. During this time members of the advisory committee were contacted and these items were disused. It was decided using SNAP plus would be the modelling program to be used to inventory the croplands, pastures and feedlots within two HUC 12 watersheds and eventually the county. Sources of information used were USDA NASS's compiled stats, remote sensing, the county wide transect survey, existing Nutrient Management Plans and consultation with Phil Holman, UWEX Agronomy Research Superintendent to verify agronomic practices to be used within the model. The use of high resolution aerial photos and DEM will assist with the inventory for compliance with NR 151 Standards and Prohibitions with further field verification as needed.

DEM - Digital Elevation Models are bare earth (topology) models of the Earth's surface.

Step 3. Discussions occurred again with members of the advisory committee to then decide the conservation practices to use to evaluate levels of reductions. These practices where then used in SNAP plus and reduction estimates for the 2 HUC 12 watersheds were calculated.

Step 4. Create a preliminary plan

Step 5. Plan review.

The plan was emailed to the Local Advisory Committee October 26th. Two separate meetings were held.

- November 9th, 2017 included:

Kathy Bartilson, WDNR - NR Basin Supervisor, Wastewater Superintendent

Pamela Toshner, WDNR – Water Resources Management Specialist, Lake Information and Management

Ruth King, WDNR - Water Resources Management Specialist, Nonpoint Source Coordinator (Regional)

Kevin Schoessow, UWEX Agriculture and Horticulture Educator

Craig Roesler, WDNR Water Resources Management Specialist, Rivers

- November 17th, 2017 included:

Dave Vold, NRCS Area Conservationist retired

Craig Walkey, Civil Engineer

Fred Blake, Research Chemist

Phil Sylla, Retired Teacher

Patricia Shifferd, Retired Professor

Linda Anderson, Retired Teacher

- Consulted throughout plan creation and individually for plan review.

Lisa Burns, Washburn LWCD Conservation & AIS Coordinator

Phil Holman, UWEX Agronomy Research Superintendent

John Haack, UWEX Natural Resource Educator, Emeritus

Ron Spiering. NRCS District Conservationist

PUBLIC HEARING

The Washburn County Land and Water Conservation Committee will hold a public hearing to accept comments and questions regarding the Washburn County Land & Water Resource Management Plan.

The public hearing will be held Thursday, November 30th, 2017, at 9:00 A.M. in the County Board Room of the Elliott Building, Shell Lake, WI. The purpose of the plan is to guide the Land & Water Conservation Department in its efforts to protect land and water resources for the next 5 years. The plan will also provide the basis for seeking funding from various private, local, state, and federal sources.

Copies of the plan are available from the Washburn County Land & Water Conservation Department located in the Lower Level of the Washburn County Courthouse, Shell Lake. The department office hours are 8:00 AM until 4:30 PM, Monday through Friday. All interested persons are invited to present comments at the hearing. The Land & Water Conservation Department will accept written comments until Friday, November 31, 2017 at 3:30 PM.

Interested persons will be given the opportunity to be heard. The committee will deliberate in "Open Session." Handicapped access is available through the south door; parking is near the door. This agenda and the subsequent meeting minutes are available in large type. If you need assistance, please call Lolita Olson at 715-468-4600, prior to the meeting.

Brent Edlin, Land & Water Conservation

NOTICES

The Washburn County Land & Water Committee will hold a business meeting **Thursday November 30, 2017** at 9:00 A.M. in the Washburn County Board Room, Elliott Building, 110 Fourth Avenue West, Shell Lake, Wisconsin.

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Brent Edlin
Land & Water Conservation

A50T2WNAXLP

November AG/LCC meeting
1 of 2
Publications
11-8-17

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Brent Edlin
Land & Water Conservation

A50T2WNAXLP

November Ag/LCC meeting
2 of 3

Publication
11-15-17

GOAL 1. Pollutant load reductions within the South Fork of the North Fork of the Clam River and the Upper Yellow River HUC 12 Watersheds.	• 5% of the cropland to a small grain cover crop following soybeans • Reduce phosphorous from cropland by converting 10% of the high phosphorous runoff fields (rotational average of 8 lbs per acre per year) to managed rotationally stocked pastures. • Convert 10% of the continuously stocked, high density pastures to pastures with rotational stocked, grass and legume forage with more than 30% legumes pastures • Reduce phosphorous from feedlots by converting 10% of their acreage to managed rotationally stocked pastures.	• *94 Lbs P per year (162 Ac.) S. Fork of the N. Fork Clam River & 13 Lbs per year (26 Ac.) In Upper Yellow River WS* • *57 Lbs P per year S. Fork of the N. Fork Clam River & 8 Lbs. P per year Upper Yellow River* • *9 Lbs P per year S. Fork of the N. Fork Clam River & Upper Yellow River WS* • *South Fork of the North Fork of the Clam River and Upper Yellow River – 0.8 acres (14 Lbs P per year)*	• 250 hours, 0 $ • 150 hours, $ 10,000 • 100 hours, $ 8,000 • 200 hours, $ 13,000
GOAL 2. Inventory and assessment of the remaining HUC 12 Watersheds	• next five years complete the inventory and assessment of the cropland for the remaining HUC 12 watersheds within the County	• 90,000 thousand acres per year - 39 HUC Watersheds, some of them a few hundred acres & partially located in County, others nearly 30,000 acres,	• 200 hours, 0 $

Goals and Objectives	Planned Activities and Benchmarks	Performance Measurements	Allocation of Resources Per Year basis (Time in hours & Resources Grant Dollars spent on Conservation Practices)
GOAL 3. Conduct additional Inventories throughout Washburn County including assessment for compliance with NR 151	• Next five years complete the inventory throughout Washburn Co For: o Unused manure storage facilities o Used manure storage facilities o Cattle access to surface water where the access levels prevents the establishment of vegetated cover o Feedlots draining directly to surface waters o Tillage near surface waters	• 90,000 Acres per year	• 100 hours, 0 $
Goal 4. Lake and Stream Protection	• Terrestrial Invasive Species education, prevention and control o Assist landowners with control options for terrestrial invasive species on their property o Monitor and control all known stands of Japanese knotweed. o Educate people about terrestrial invasive species • Aquatic Invasive Species education, prevention and control o Monitor lakes using the DNR Early Detection Protocol o Conduct Clean Boats Clean Waters Inspections at boat landings o Conduct AIS Citizen Lake Monitoring workshops property o Release purple loosestrife bio-control beetles • Installation of shoreline buffers • Protect stream and lake shore from erosion	• 5 landowners, control 0.5 acres per year • 10 stands per year • 100 people per year • monitor 3 lakes per year • 200 hours Inspections, Clean Boats Prgogram per year • 2 Lake Monitoring workshops per year • 2 Workshops Clean Boats Clean Waters per year • 50 feet of shoreline buffer a year, 250 feet (0.2 Acres) in the next 5 • 50 feet of stream and lakeshore protection per year, 250 in the next 5	• 300 hours, $0 • 200 hours, $0 • 200 hours, $0 • 200 hours, $0 • 200 hours, $0 • 150 hours, $0 • 150 hours, $0 • 100 hours, $3,000 • 200 hours, $4,000

Goals and Objectives	Planned Activities and Benchmarks	Performance Measurements	Allocation of Resources Per Year basis (Time in hours & Resources Grant Dollars spent on Conservation Practices)
Goal 5. Groundwater Protection	• Proper abandonment of unused manure storage structures • Proper abandonment of unused drinking wells	• Target 0.5 per year, 2.5 in the next 5 years • 1 per year, 5 in the next 5 years	• 150 hours, $7,000 • 50 hours, $1000
GOAL 6. Nutrient Management planning and training	• Of the remaining 20 dairy farmers increase by 30% those that have a Nutrient Management Plan	• 240 Acres per year, 5 years1,200 Acres	• 200 hours, $3000
GOAL 7. Assist municipalities in protecting and enhancing recreational areas, to and near lakes and rivers.	• Improve access roads to lake and rivers by diverting runoff water from flowing over them • Assist with design and grants as needed for providing access, improving existing accesses and improve accesses to meet ADA requirements • Install infiltration basins to capture and infiltrate storm water runoff	• Target 0.5 per year, 2.5 in the next 5 years • Target 0.5 improvements per year, 2 in the next 5 years • Target 0.5 basins per year, 2.5 in the next 5 years	• 200 hours, $5000 • 100 hours, $0 • 100 hours, $5,000
GOAL 8. Assistance with Permits and Ordinances	• Animal Waste Ordinance • Shoreline Ordinance • Nonmetallic mining	• 1 Permit, constrcution plan review & 2 Nutreint Management Plans • 5 plan reviews, 1 plan creation • 2 plan reviews, 4 site complaince checks	• 100 hours , $0 • 100 hours, $0 • 200 hours, 0$

Practice	Definition
Access road.	a road or pathway that confines or directs the movement of livestock, farm equipment, or vehicular traffic, and that is designed and installed to control surface water runoff, to protect an installed practice, or to prevent erosion.
Barnyard runoff control systems.	a system of facilities or practices used to contain, divert, retard, treat, or otherwise control the discharge of runoff from outdoor areas of concentrated livestock activity.
Contour farming.	plowing, preparing, planting, and cultivating sloping land on the contour and along established grades of terraces or diversions.
Cover crop.	close-growing grasses, legumes, or small grain grown for any of the following purposes:
Critical Area Stabilization.	planting suitable vegetation on erodible areas such as steep slopes and gullies, so as to reduce soil erosion or pollution from agricultural nonpoint sources
Diversions.	A structure installed to divert excess surface runoff water to an area where it can be used, transported, or discharged without causing excessive soil erosion. Includes a channel with a supporting earthen ridge on the lower side, installed across the slope with a self-discharging and non-erosive gradient.
Feed storage runoff control systems.	a system of facilities or practices to contain, divert, retard, treat, or otherwise control the discharge of leachate and contaminated runoff from livestock feed storage areas.
Field windbreaks.	means a strip or belt of trees, shrubs, or grasses established or renovated within or adjacent to a field, so as to control soil erosion by reducing wind velocities at the land surface.
Filter strips.	an area of herbaceous vegetation that separates an environmentally sensitive area from cropland, grazing land, or disturbed land.
Grade stabilization structures.	a structure which stabilizes the grade in a channel in order to protect the channel from erosion, or to prevent gullies from forming or advancing. May include any of the following: (a) Detention or retention structures such as dams, desilting reservoirs, sediment basins, and debris basins. (b) Related structures such as channel linings, chutes, drop spillways, or pipe drops.
Livestock fencing.	means either of the following: (a) Excluding livestock, by fencing , in order to protect an erodible area or a practice under this subchapter. (b) Restricting, by fencing , human access to manure storage structures or other practices under this subchapter which may pose a hazard to humans.
Livestock watering facilities.	a trough, tank, pipe, conduit, spring development, pump, well, or other device or combination of devices installed to deliver drinking water to livestock.
Manure storage structure	impoundment made by constructing embankments, excavating a pit or dugout, or fabricating a structure and related practices needed for the environmentally safe storage of manure
Manure storage system closure.	permanently disabling and sealing a leaking or improperly sited manure storage system.

Milking center waste control systems.	a system of facilities or equipment designed to contain or control the discharge of milking center waste.
Nutrient management.	A farm nutrient management plan is a strategy for obtaining the maximum economic return from both on- and off-farm fertilizer resources.
Pesticide management.	controlling the storage, handling, use, and disposal of pesticides used in crop production in order to minimize contamination of water, air, and nontarget organisms.
Prescribed grazing.	a grazing system which divides pastures into multiple cells, each of which is grazed intensively for a short period and then protected from grazing until its vegetative cover is restored.
Relocating or abandoning animal feeding operations.	(a) "Abandonment" means discontinuing an animal feeding operation in order to prevent surface water or groundwater pollution from that animal feeding operation. (b) "Animal feeding operation" means a feedlot or facility, other than a pasture, where animals are fed, confined, maintained, or stabled for 45 days or more in any 12-month period. (c) "Relocation" means discontinuing an animal feeding operation at one site and commencing that operation at a suitable alternate site in order to minimize the amount of surface water or groundwater pollution from that animal feeding operation.
Residue management.	Preparing land surfaces for the planting and growing of crop plants using methods that result in a rough land surface which is covered in varying degrees by vegetative residues of a previous crop, and which provides a significant degree of resistance to soil erosion by raindrop impact, surface water runoff, or wind. Or, Planting crop seeds in a narrow slot or a narrow strip of tilled soil, in order to maintain residue cover and avoid disturbing the entire soil surface.
Riparian buffers.	an area in which vegetation is enhanced or established to reduce or eliminate the movement of sediment, nutrients, and other nonpoint source pollutants to an adjacent surface water resource or groundwater recharge area, to protect the banks of streams and lakes from erosion, and to protect fish habitat.
Roof runoff systems.	facilities for collecting, controlling, diverting, and disposing of precipitation from roofs. A "roof runoff system" may include gutters, downspouts, erosion-resistant channels, subsurface drains, and trenches.
Roofs.	a weather-proof covering that shields an animal lot or manure storage structure from precipitation, and includes the structure supporting that weather-proof covering
Sediment basins.	permanent basins that reduce the transport of waterborne pollutants such as eroded soil sediment, debris, and manure sediment. Sediment basins may include containment walls or berms, pickets or screens to filter debris, orifices or weirs to control discharge, and conduits to direct runoff to treatment or discharge areas.
Stream Crossing.	a road or pathway which confines or directs the movement of livestock, farm equipment, or vehicular traffic over a stream, and which is designed and installed to improve water quality, reduce erosion, protect an installed practice, or control livestock access to a stream.
Streambank or shoreline protection.	waterbody-specific treatments used to stabilize and protect the eroding banks of streams or constructed channels, and shorelines of lakes, reservoirs

Stripcropping.	growing crops in a systematic strip arrangement in which strips of grass, legumes, or other close growing crops are alternated with strips of clean tilled crops or fallow, and in which all of the strips are established on the contour or across a slope to reduce water or wind erosion.
Subsurface drains.	a conduit installed below the surface of the ground to collect drainage water and convey it to a suitable outlet.
Terrace systems.	a system of ridges and channels installed on the contour with a non-erosive grade and suitable spacing.
Trails and walkways.	a travel lane to facilitate movement of livestock or people
Underground outlets.	a conduit installed below the surface of the ground to collect surface water and convey it to a suitable outlet.
Waste transfer systems.	components such as pumps, pipes, conduits, valves, and other structures installed to convey manure and milking center wastes from buildings and animal feeding operations to a storage structure, loading area, or treatment area.
Wastewater treatment strips.	an area of herbaceous vegetation that is used as part of an agricultural waste management system to remove pollutants from animal lot runoff or wastewater, such as runoff or wastewater from a milking center.
Water and sediment control basins.	an earthen embankment or a ridge and channel combination which is installed across a slope or minor watercourse to trap or detain runoff and sediment.
Waterway systems.	a natural or constructed waterway or outlet that is shaped, graded, and covered with a vegetation or another suitable surface material to prevent erosion by runoff waters.
Well decommissioning.	permanently disabling and sealing a well to prevent contaminants from reaching groundwater.
Wetland development or restoration.	the construction of berms, or the destruction of tile line or drainage ditch functions, to create or restore conditions suitable for wetland vegetation.